



TorqueLab® LTT-Series

Operating Instructions

Version 3.3
3/22/17



Heading	Page	Heading	Page
External Connections	3	Tool Test Operation	24
User Interface	3	Angle Test Operation	28
Quick Menu Structure	4	Torque Sensor Calibration	30
Screen Display	5	Data Logging (Graphing)	32
Menu Selections	5	Torque Meter Bootloader	36
Mode Selections	8	Accessory - Bar Code Reader	38
Environmental Conditions	9	Accessory - Multiplexer	40
Set-Up Selections	10	Force & Load Sensors	41
Transducer Calibration Reminder	17	End User Software License Agreement	41
ARCII	17	Mountz Service Locations	45
Power On & Battery Operation	18		
Installation of Mountz Torque Meter Interface Program	18		

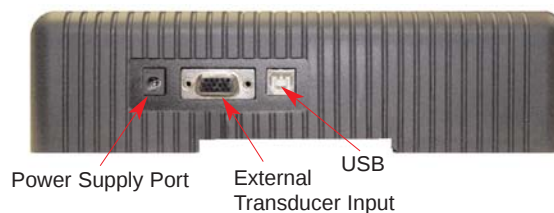
Features

- ❑ System Accuracy +/- 0.5% of reading from 20% to 100% of full scale.
System Accuracy +/- 1% of reading from 10% to 20% of full scale.
- ❑ Recommended for all hand screwdrivers, wrenches or power tools.
- ❑ Provides “EZ-Plug & Play” with Mountz Torque Sensors. Features “ARCII” technology, an instant auto-recognition system of the sensor connected to the LTT.
- ❑ Selection of six operating modes: (Track, Peak, First Peak, Audit, Spindle Audit and Torque + Angle).
- ❑ Seven units of torque measurements: (ozf.in, lbf.in, lbf.ft, cN.m, N.m, kgf.m, kgf.cm).
- ❑ Two units of force measurements: (lbf and kN)
- ❑ Features built-in Tool Tests operation.
- ❑ Includes three PC Windows based software programs:
 - Mountz Torque Meter Interface Program-** for sensor calibrations, meter calibration and tool tests.
 - Torque Meter Bootloader** - for updating the LTT operating systems.
 - "Excel Add-In"** for Real-Time data collection into an Excel spreadsheet. It also provides statistics calculations.
- ❑ “Flash” memory allows upgrades to be done by the user in the field & internet through the USB port.
- ❑ Five low-pass filter selections (3000, 2000, 1500, 500 and 200 Hz).
- ❑ Easy to use Menu Structure.
- ❑ Six-digit display.
- ❑ Real Time Clock for time stamping of readings.
- ❑ USB interface to download readings to PC.
- ❑ High Capacity Li-Ion Batteries for long life (30 hrs with standard transducers and 16 hrs with brushless rotary).
- ❑ Can connect to most mv/v transducers and can store calibration data for up to 50 non smart torque & force sensors.
- ❑ The 5VDC capability allows unit to be used with a Brushless Rotary Transducer for testing pulse tools and high RPM tools.
- ❑ Torque and Angle data is displayed simultaneously when used with Torque and Angle sensors, up to 8000 RPM for angle measurement.
- ❑ Stores a total of 5000 data points.
- ❑ Real time graph of torque vs. time using associated PC Windows software.
- ❑ Features Go / No Go LEDs that illuminate when high or low setting is achieved.
- ❑ Display Accuracy is better than +/- 0.0625 of reading.

External Connections

USB

The computer connection is USB. There is no setup required. This allows for data to be downloaded to a PC. The PC will require a USB I/O.



External Transducer Input

The transducer connector is a high density D-Sub connector with 15 pins. The pin description is shown below:

Pin Number	Function	Description
1	Analog Ground	
2	Brushless Signal	Output from brushless torque sensors + /- 5V
3	Multiplexer	Used for the Multiplexer
4	Sensor Direct	Used to detect torque sensors
5	Digital Ground	
6	Excitation Voltage +	5V or 16 volts depending on bridge or brushless torque sensor
7	Bridge Signal -	Negative output from bridge torque sensor
8	Multiplexer	Used for the Multiplexer
9	Angle Lead	TTL output from angle detector in angle sensor
10	Sensor Drive	Used to detect torque sensors
11	Bridge Signal +	Positive output from bridge torque sensor
12	Shield	
13	Angle Trail	TTL output for angle lags Angle Lead by 90 degrees
14	+5 Volt Angle Supply	
15	Data for "Smart" torque sensors	Proprietary ARCII protocol for smart torque sensors from Mountz

User Interface



Display Screen

Displays the menu structures, torque readings, operating mode, torque units.

Function Keys

Functions will be identified on the display screen.

Go and No Go LEDs

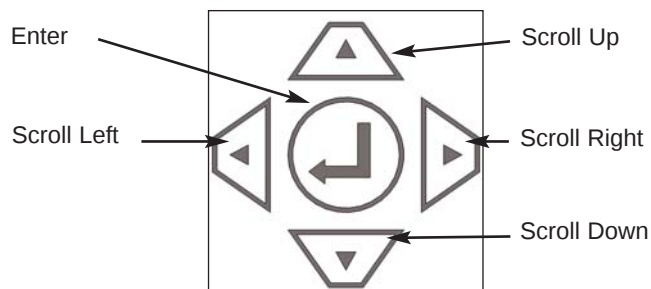
Used to monitor lower and upper torque limits and receive a visual warning.

Internal Transducer

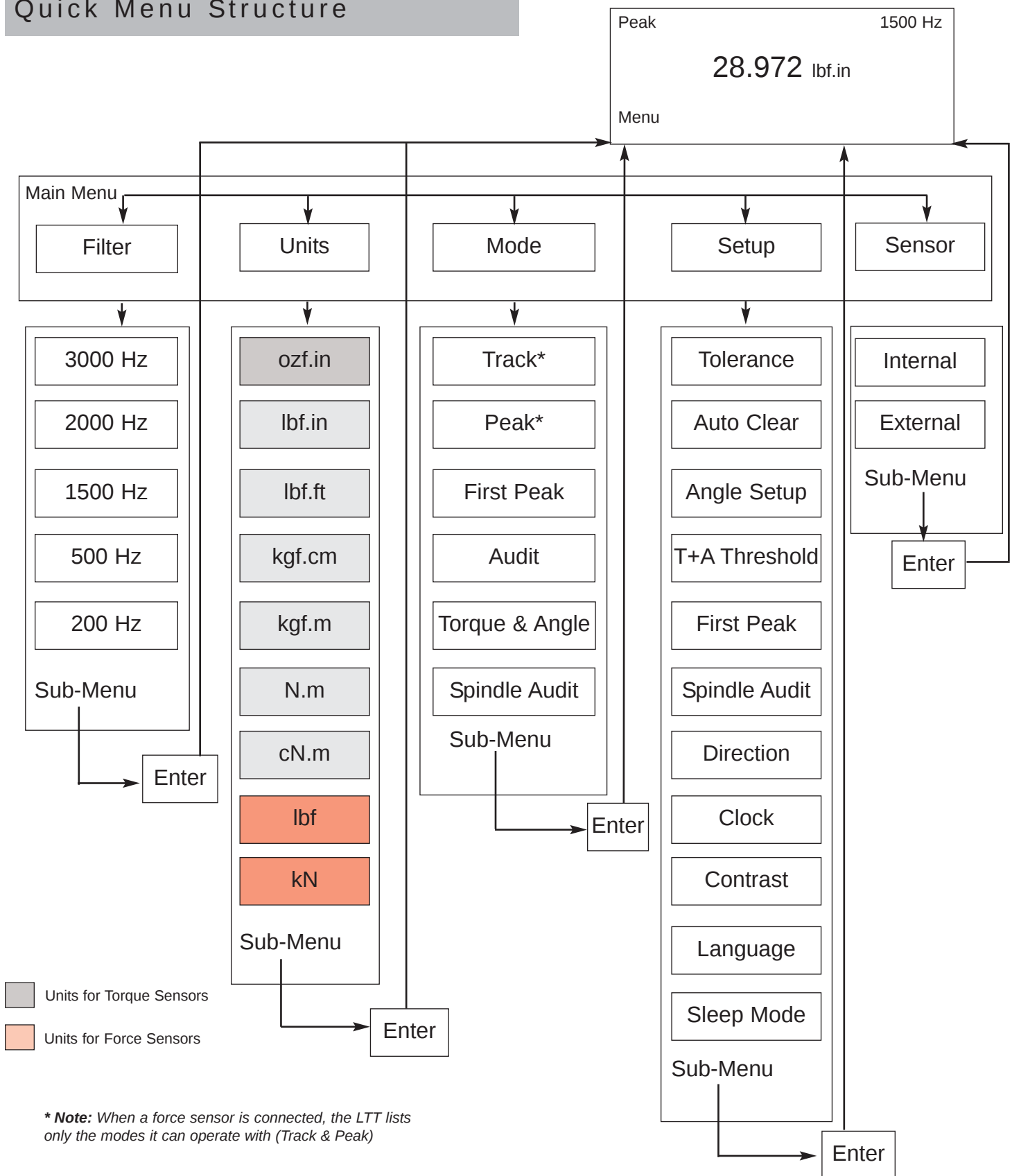
Built-in transducer

"Scroll and Enter Keys"

Used to toggle through the different menu structures.

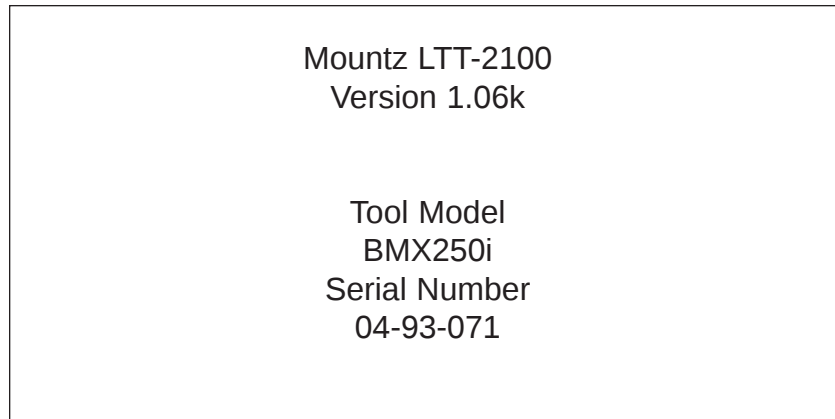


Quick Menu Structure



Screen Display

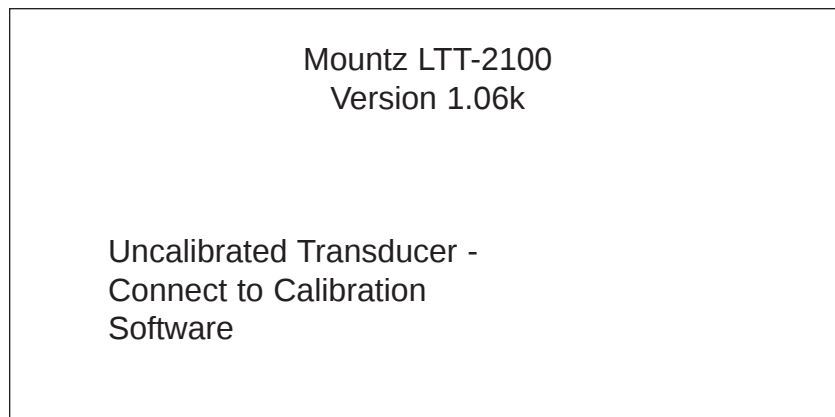
When the Torque Analyzer is turned on and it is connected to a Mountz "Smart" Torque Sensor with ARCII technology it will display a Screen similar to that below for 5 seconds and then go into Reading Mode. This will also happen if a "Smart" torque sensor is disconnected and another smart torque sensor is connected. It will automatically detect if the sensor is a torque or force sensor.



Note:

When disconnecting a smart torque sensor and connecting another, the operator must unplug the cable from the LTT unit.

If an un-calibrated torque sensor or force sensor is connected then the Analyzer will display a screen as below.



Note:

The LTT supports Non-Smart torque sensors & force sensors as well as Non-Mountz torque sensors. Non-smart torque sensors can be detected and can be calibrated in the "internal" memory. The LTT will offer 2 choices. It offers to calibrate or choose from a list of torque sensors stored in the internal memory.

Reading Screen

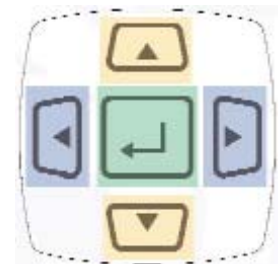
Track	3000 Hz
+0.0000	
	Lbf.in
Menu	Tool Tests

Menu Selections

Pressing the "Menu" Key will present the following Screen:

- 1. Use the **Scroll Up or Down** key to toggle through: Filter, Units, Mode and Setup.
- 2. Press **Enter** key to select a choice.

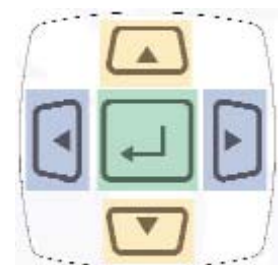
Filter
Units
Mode
Setup
Main



Selecting Filters

- 1. Select Filter by highlighting and pressing **Enter**.
- 2. Use the **Scroll Up or Down** key to toggle through the Filter options.
- 3. Press **Enter** key to select a Filter Setting.

Filter	3000 Hz
Units	2000 Hz
Mode	1500 Hz
Setup	500 Hz
Main	200 Hz
	Cancel



Note:

Not applicable for Force & Load Sensors.

Menu Selections

Selecting Units

1. Select Units by highlighting and pressing **Enter**.
2. Use the **Scroll Up or Down** key to toggle through the Unit options.
3. Press **Enter** key to select a Filter Setting.

	For Torque Sensors	For Force Sensors
Filter	lbf.in	lbf
	lbf.ft	kN
Units	ozf.in	
Mode	kgf.cm	
	kgf.m	
Setup	N.m	
Main	Cancel	

Selecting Mode Options

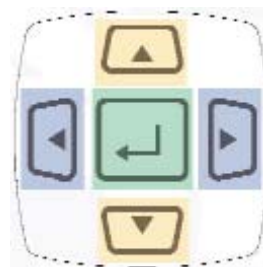
1. Select Mode by highlighting and pressing **Enter**.
2. Use the **Scroll Up or Down** key to toggle through the Mode options.
3. Press **Enter** key to select a Mode Setting.
4. The Main (or reading screen) will display the value of the selected Mode.

	For Torque Sensors	For Force Sensors
Filter	Track	Track
	Peak	Peak
Units	First Peak	
Mode	Audit	
	Torque + Angle	
Setup	Spindle Audit	
Main	Cancel	

Selecting Setup

1. Select Setup by highlighting and pressing **Enter**.
2. Use the **Scroll Up or Down** key to toggle through the Setup options.
3. Press **Enter** key to select a Setup Setting.

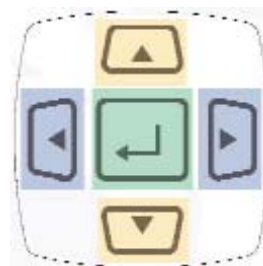
Filter	Tolerance
Units	Auto Clear
Mode	Angle Setup
	T+A Threshold
Setup	First Peak
	Spindle Audit
Main	



Note:

When a torque sensor is connected, the LTT lists only torque units. Also, cN.m is also available but you must scroll down.

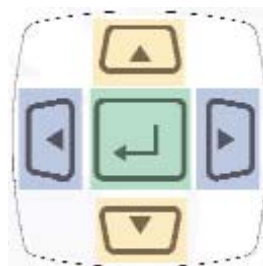
When a force sensor is connected, the LTT lists only force units.



Note:

When a torque sensor is connected, the LTT lists only modes it can operate with.

When a force sensor is connected, the LTT lists only modes it can operate with.



Note:

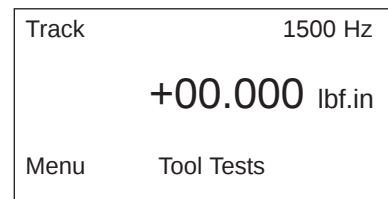
Direction, Clock, Contrast, Language, & Sleep is also available but you must scroll down.

Mode Selections

Track

With a torque sensor, this mode constantly tracks increasing or decreasing torque variations. Use this mode to monitor varying torque on motors and machinery. Also for calibration and testing of dial torque products (small wrenches or dial screwdrivers).

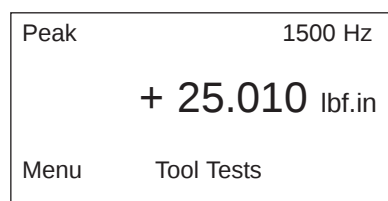
Also used for force & load applications with a force sensor.



Peak

With a torque sensor, the display retains the highest torque applied. Use this mode during calibration or testing of any hand type torque wrench (dial, beam, and screwdriver), as well as power tools.

Also used for force & load applications with a force sensor.

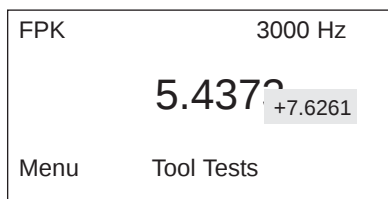
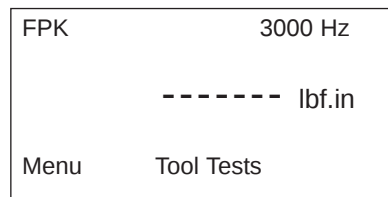


First Peak

The display holds the first detected torque peak applied. Before any torque is applied, the display show dashes in the torque value area. Once peak is detected, the display will show the torque value. If a second peak is detected then it will be displayed in the lower right (in small reverse video).

This function is primarily used for testing and calibrating click type mechanical torque wrenches. The LTT captures the point where the wrench clicks. This peak may be used for operator training on correct use of the wrench. Always apply torque smoothly to avoid false first peak readings. See page 13 for setting up First Peak.

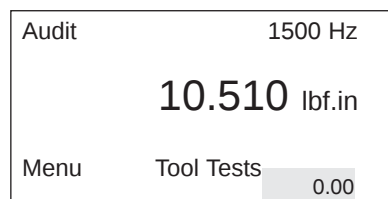
Not applicable for Force & Load Sensors.



Audit

This mode is used to determine “first movement” or what is commonly known as “break-away” torque to determine the actual torque on the joint. An angle enabled transducer is required to operate in this mode. See page 11 for setting up Angle Threshold.

Not applicable for Force & Load Sensors.



Mode Selections

Torque + Angle

This allows an operator to set up an initial torque and follow up with a rotation to a specified angle and display the final torque.

The LTT can collect Torque and Angle data if the unit is connected to a transducer that includes the angle function. It is a "Real Time" angle function that can capture Torque and Angle up to 8000 RPM. See page 12 for setting up Torque + Angle.

Not applicable for Force & Load Sensors.

T+A	3000 Hz
9.9985 lbf.in	10 deg
Menu	Tool Tests

Spindle Audit

This feature is designed for auditing the operation of a Spindle Tool. An angle enabled transducer is required to operate in this Mode. The unit checks the Torque and Angle setting of a Spindle. When the spindle stops, the LTT will display and record the final angle, and final peak torque. See page 14 for setting up Spindle Audit.

Spindle Audit	1500 Hz
+18.969 lbf.in	
Menu	Tool Tests +2.8723

Environmental Conditions

Operating Temperature: 0 Degrees Centigrade to 50 Degrees Centigrade

Storage Temperature: -20 Degrees Centigrade to 70 Degrees Centigrade

Humidity: Maximum of 95% Relative Humidity

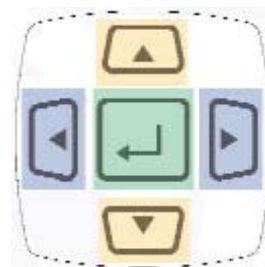
Setup Selections

Tolerance

The Tolerance parameters control the Go and No-Go signal response (see Go / No Go Signal section). The user sets a lower and upper torque thresholds to get a visual and audible warning signals when these limits are reached or breached during operation. This function is primarily used for safety and quality control.

Selecting Tolerance

1. Press the **"Menu"** Button.
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **Tolerance**.



Filter	Tolerance
Units	Auto Clear
Mode	Angle Setup
Setup	T+A Threshold
	First Peak
	Spindle Audit

1. Press the **Right** or **Left** key to toggle between High and Low Tolerance..
2. Use the **Scroll Up or Down** key to change the tolerance settings .
3. Press **Enter** key once setting is complete.
4. Press **Main** button to return to main display screen.

Tolerance Setting	
Low: _0.000	lbf.in
High: 84.950	lbf.in
Main	

Clear

This function controls the method of clearing the display of torque readings.

Auto Clear

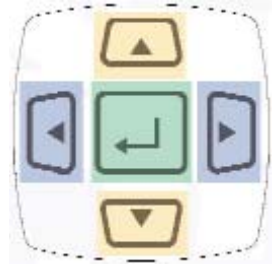
When Auto Clear is selected, the torque values, during operation, will automatically be cleared from the display. The user can set the time threshold to control how long the values should be displayed before clearing.

Manual Clear

When Manual Clear is selected, the torque values during operation will indefinitely be display until the user presses the Clear key.

Selecting Clear

1. Press the **"Menu"** Button.
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **Auto Clear**.



Filter	Tolerance
Units	Auto Clear
Mode	Angle Setup
Setup	T+A Threshold
	First Peak
	Spindle Audit

1. Use the **Scroll Up or Down** key to toggle between Manual or Auto Clear.
2. Press the **Scroll Left or Right** key to move down to the Time selection
3. For Auto Clear, use the **Scroll Up or Down** key to toggle between the selection of time between 1- 5 seconds.
4. Press **Enter** key once setting is complete.
5. Press **Main** button to return to main display screen.

Auto Clear Setting

Mode: Auto
Time (seconds): 2

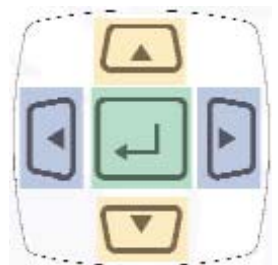
Main

Angle Setup

This menu item contains 2 selections. The first selection is the Angle Threshold for Audit Mode. The default is 2 degrees but it can be set from 1 to 5 degrees. The second selection is Angle Polarity. Angle Polarity is used when you find that the Angle is giving a negative sign when the Torque applied is Clockwise. This may be needed to compensate for some transducers that have the wrong polarity for Angle.

Selecting Angle Setup

1. Press the **"Menu"** Button.
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **Angle Setup**.



Filter	Tolerance
Units	Auto Clear
Mode	Angle Setup
Setup	T+A Threshold
	First Peak
	Spindle Audit

1. Use the **Scroll Left or Right** key to toggle between Angle Threshold and Angle Polarity.
2. Use the **Scroll Up or Down** key to toggle through the degree values (0.25-5) for Angle Threshold. It move at increments of 0.25
3. Use the **Scroll Up or Down** key to toggle Angle Polarity options: Normal or Reverse
4. Press **Enter** key once setting is complete.
5. Press **Main** button to return to main display screen.

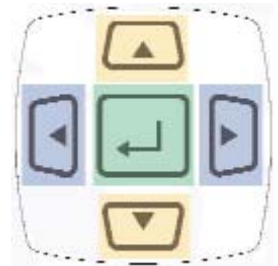
Angle Setup	
Angle Threshold:	2 deg
Angle Polarity:	Normal
Angle Encoder:	360
Main	

Torque + Angle

This allows an operator to set up an initial torque and follow up with a rotation to a specified angle and display the final torque.

Selecting Torque + Angle

1. Press the **"Menu"** Button.
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **Torque + Angle**.



Filter	Tolerance
Units	Auto Clear
Mode	Angle Setup
Setup	T+A Threshold
	First Peak
	Spindle Audit

1. Press the **Right or Left** key to toggle between the three settings: Angle, Torque Allow Ratchet
2. Use the **Scroll Up or Down** key to set Angle (increments of 0.25)
3. Use the **Scroll Up or Down** key to set Torque (increments of 0.5)
4. Use the **Scroll Up or Down** key to set "Yes" or "No" for allowing ratchet*.
5. Press **Enter** key once setting is complete.
6. Press **Main** button to return to main display screen.

* Note - "Yes" allows for ratcheting the wrench back without accumulating angle.

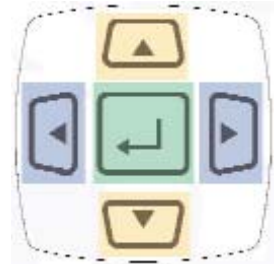
Torque+Angle Thresh		
Angle:	2.00	deg
Torque:	50.000	lbf.in
Allow Ratchet:	No	
Main		

First Peak

The display holds the first detected torque peak applied. Before any torque is applied, the display show dashes in the torque value area. Once peak is detected, the display will show the torque value. If a second peak is detected then it will be displayed in the lower right (in small reverse video).

Selecting First Peak

1. Press the **"Menu"** Button.
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **First Peak**.



Filter	Tolerance
Units	Auto Clear
Mode	Angle Setup
Setup	T+A Threshold
	First Peak
	Spindle Audit

1. Use the **Scroll Up or Down** key to toggle through the sensitivity settings:
(Low, Medium & High)
2. Press the **Right** or **Left** key to move down to the Min Peak setting location
3. Use the **Scroll Up or Down** to set the Minimum Peak
4. Press **Enter** key once setting is complete.
5. Press **Main** button to return to main display screen.

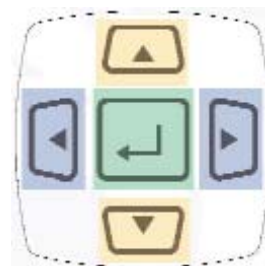
First Peak Setup		
Sensitivity:	Low	
Min Peak:	5.0089	Lbf.in
Main		

Spindle Audit

This feature is designed for auditing the operation of a Spindle Tool. An angle enabled transducer is required to operate in this Mode. The unit checks the Torque and Angle setting of a Spindle. When the spindle stops, the LTT will display and record the final angle, and final peak torque.

Selecting Spindle Audit

1. Press the **"Menu"** Button.
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **Spindle Audit**.



Filter	Tolerance
Units	Auto Clear
Mode	Angle Setup
Setup	T+A Threshold
	First Peak
	Spindle Audit

1. Press the **Right** or **Left** key to toggle between the settings.
2. Use the **Scroll Up or Down** key to set torque and angle settings.
4. Press **Enter** key once setting is complete.
5. Press **Main** button to return to main display screen.

Spindle Audit Thresh
Initial Torque: 43 lbf.in
Low Angle: 25 deg
High Angle: 28 deg
Main

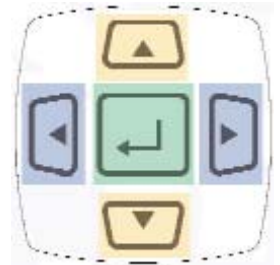
Direction

Allows an operator to set the direction for capturing the torque readings: (Clockwise, Counter Clockwise and Both directions).

When performing a dead weight calibration, the direction should be set for both directions.

Selecting Direction

1. Press the **"Menu"** Button .
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **Direction**.



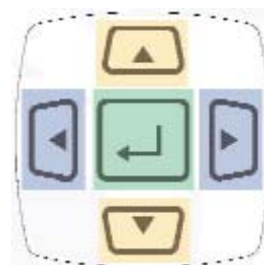
Filter	Auto Clear
Units	Angle Setup
Mode	T+A Threshold
Setup	First Peak
	Spindle Audit
	Direction

1. Use the **Scroll Up or Down** key to toggle through the direction settings:
(Both, CW, CCW)
2. Press **Enter** key once setting is complete.
3. Press **Main** button to return to main display screen.

Direction Setting
Direction: BOTH
Main

Selecting Clock

1. Press the **"Menu"** Button.
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **Clock**.



Filter	Angle Setup
Units	T+A Threshold
Mode	First Peak
Setup	Spindle Audit
	Direction
	Clock

1. Use the **Scroll Up or Down** key to toggle through the digits for the date and time.*
2. Use the **Right and Left** key to move through the time and date sections.
3. Press **Enter** key once setting is complete.
4. Press **Main** button to return to main display screen.

Clock Setting
5:57 PM
4/24/08
Main

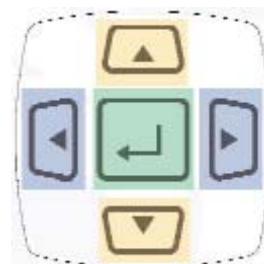


Note:

Must toggle through the first "time digits" to change from AM to PM.

Selecting Language

1. Press the **"Menu"** Button .
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **Language**.



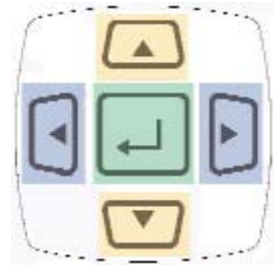
Filter	First Peak
Units	Spindle Audit
Mode	Direction
Setup	Clock
	Contrast
	Language

1. Use the **Scroll Up or Down** key to toggle through the Language settings: (English or Deutsch)* Other languages to be added in the future
2. Press **Enter** key once setting is complete.
3. Press **Main** button to return to main display screen.

Language Setting
Language: Deutsch
Main

Selecting Sleep

1. Press the **"Menu"** Button.
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **Sleep**.



Filter	Spindle Audit
Units	Direction
Mode	Clock
Setup	Contrast
	Language
	Sleep

1. Use the **Scroll Up or Down** key to toggle through the Sleep settings:
(On or Off)
2. Press **Enter** key once setting is complete.
3. Press **Main** button to return to main display screen.

Sleep Mode Setting
Auto Sleep: On
Main

Transducer Calibration Reminder

Six months from the date of the transducer's calibration a message will appear on the screen informing the operator that the calibration interval has been exceeded. At this point the operator can pull the Transducer out of service or decide to continue to use it. After the initial message the user will be reminded each time they connect the transducer.

ARCII (Auto Recognition Chip)

The LTT provides "EZ-Plug & Play" with Mountz Transducers that feature "ARCII" technology, an instant auto-recognition system of the transducer connected to the LTT. When an ARCII Transducer is connected to the LTT it automatically recognizes the transducer and displays the Model and Serial Number of the connected transducer on the LTT.

The information stored in the ARCII chips contains:

- ❑ The Model of Transducer
- ❑ The Serial Number of the Transducer
- ❑ True Calibration Information
- ❑ Date of Calibration

Power On & Battery Operation

There is no switch to turn on the LTT unit. Just press a key and the unit will power on. When the unit has not been used for a designated time frame it will enter "Sleep Mode" if the Sleep Mode has not been disabled. The unit features a processor that checks to see if a key pressed while it is in the Sleep Mode. There is no significant drain on the batteries.

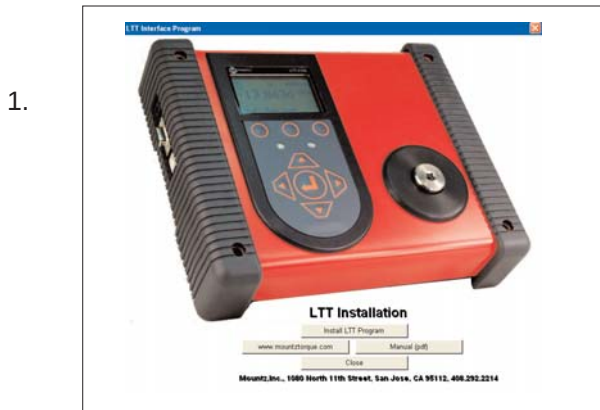
Note: Units with operating software Version K and beyond, the LTT can be shut-off by holding the **Enter** key for 7 seconds.

The LTT is powered using the high capacity Li-Ion batteries for a long battery life. The battery pack should last up to 30 hours with normal use and 16 hours with a brushless transducer with a maximum charge. The battery icon is always on the display. It is filled in completely when fully charged and shows white space as the battery depletes.

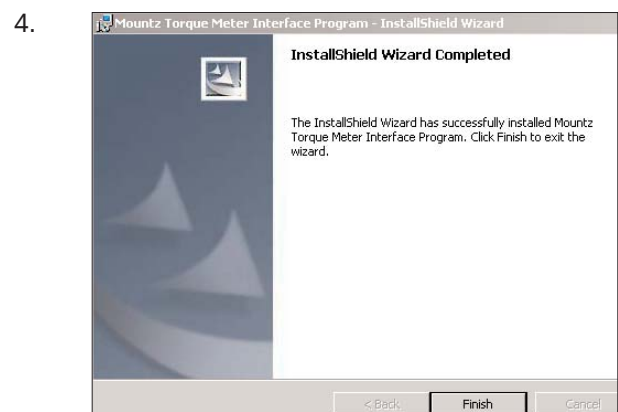
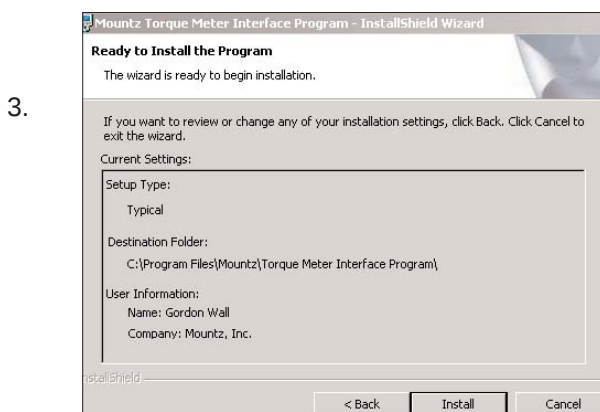
Installation of LTT "Mountz Torque Meter Interface Software"

The interface software allows the operator to conduct Tool Tests, Sensor Calibration and Meter calibration.

1. Insert the CD into the PC and the LTT Interface Program splash screen will appear. Click on "Install LTT Program".
2. Enter the required information and click Next Button.



3. Click install.
4. After the installation is successful just click Finish.



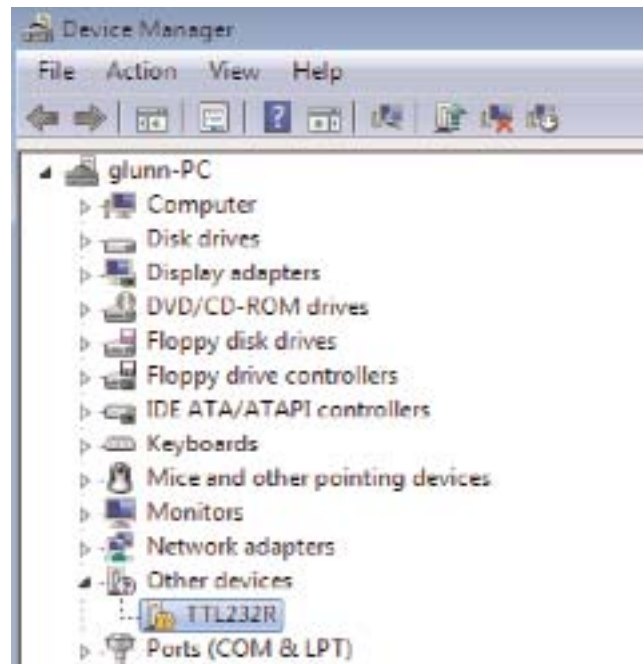
USB Driver Installation

Windows 7 Installation

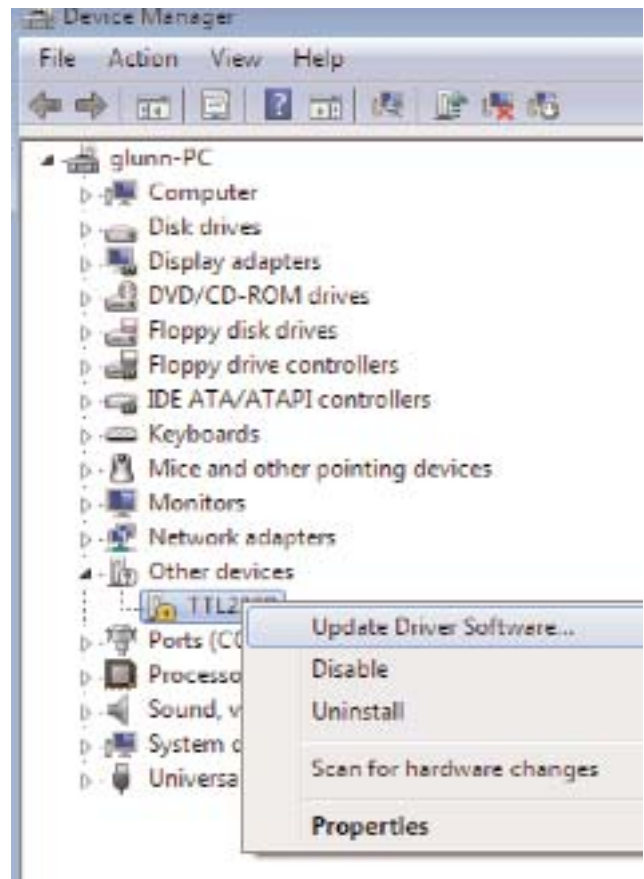
Connect the device to a spare USB port on your Laptop or PC. If there is an available Internet connection, Windows 7 will silently connect to the Windows Update website and install any suitable driver it finds for the device.

If a suitable driver is not found, the following procedure should be followed:

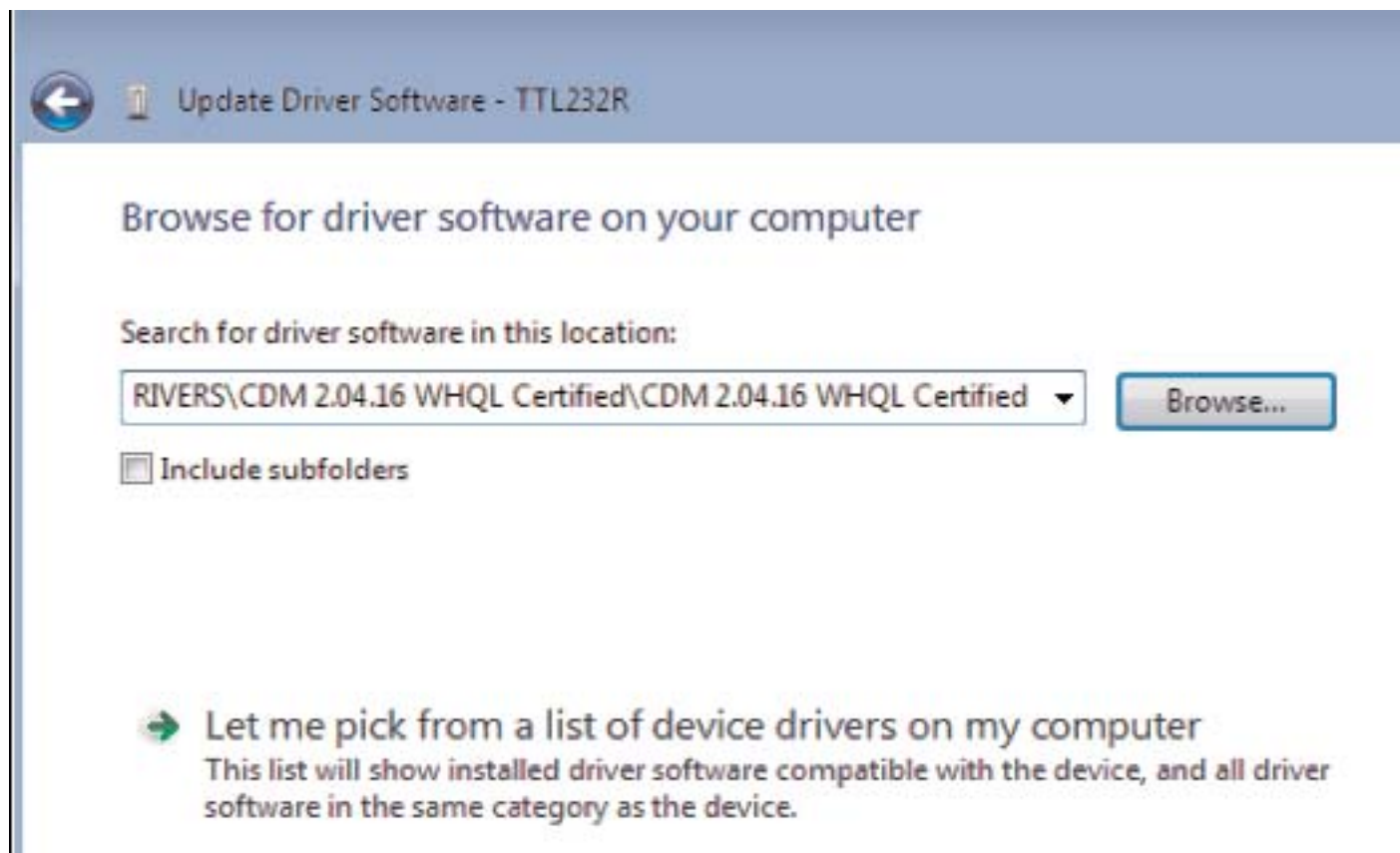
- 1) Go to My Computer
- 2) Right click on My Computer, click on properties
- 3) Select the hardware tab and click on Device Manager to bring up Device Manager window



- 1) Right Click on the other device (TTL232R in this example) to bring up a menu as shown below:



- 2) From the displayed menu select " Update Driver Software" to bring up the Device Driver wizard.
- 3) Select the second option "Browse my computer for the driver software"



- 4) Click on the Browse tab and browse to the specific location where the USB driver is located. The default directory (if the CD information is saved under the C drive under Program Files) is C:\program files\Mountz\Torque Meter Interface Program\USB Device Driver
- 5) Click next to begin the driver update process. A confirmation window will be displayed as soon as the installation has been completed successfully with a prompt to close the final installation window. Click close on the final confirmation window to complete the process.

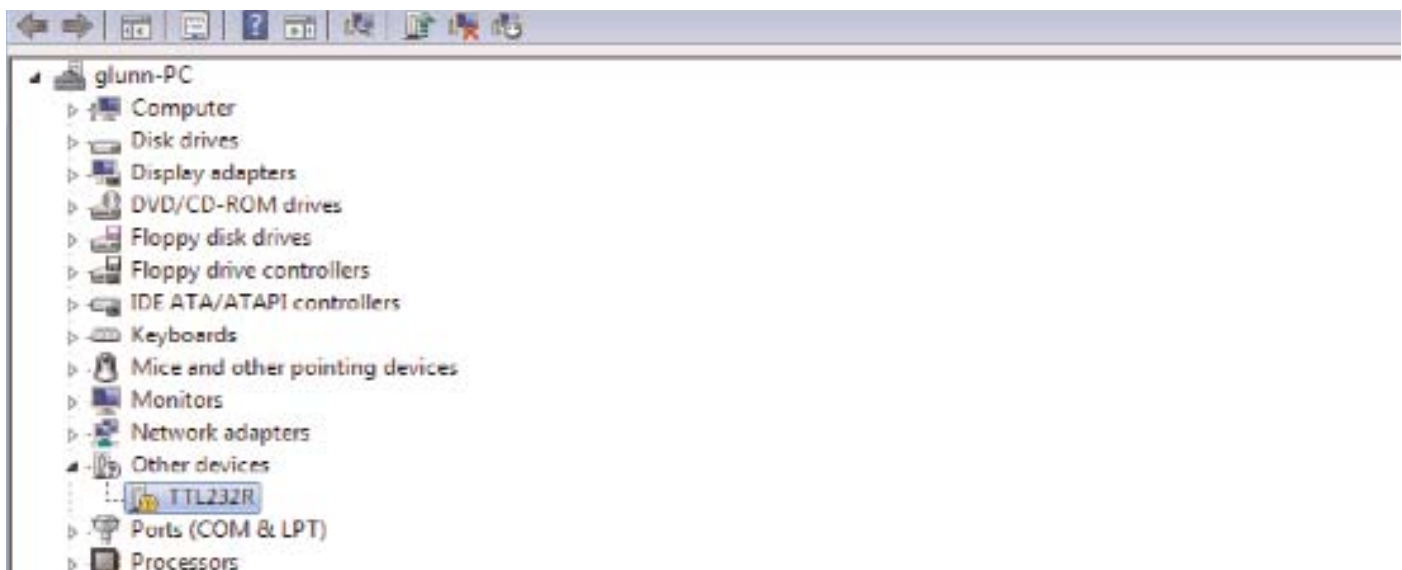


Windows XP Installation

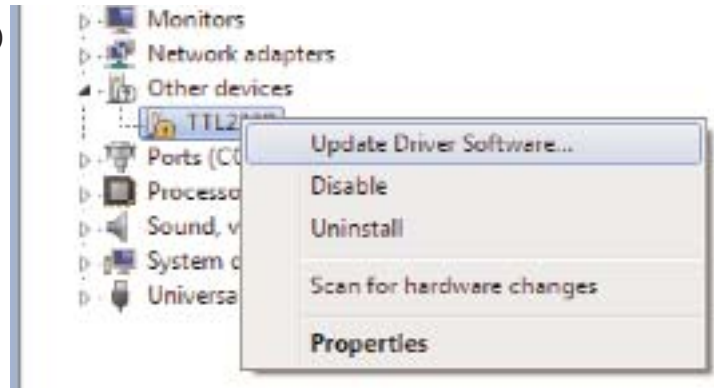
Connect the device to a spare USB port on your Laptop or PC. If there is an available Internet connection, Windows XP will silently connect to the Windows Update website and install any suitable driver it finds for the device.

If a suitable driver is not found, the following procedure should be followed:

- 1) Go to My Computer
- 2) Right click on My Computer, click on properties
- 3) Select the hardware tab and click on Device Manager to bring up Device Manager window

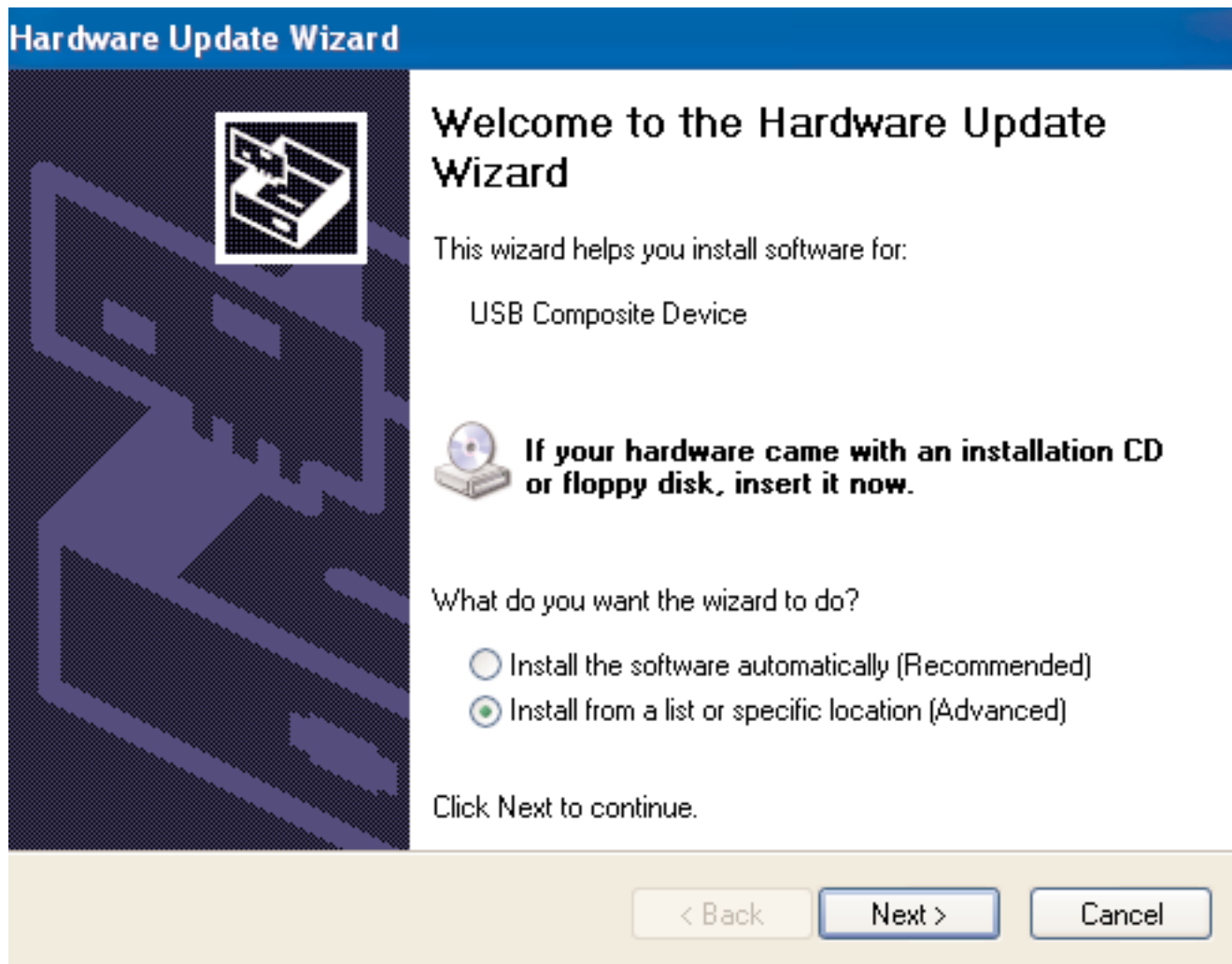


4) Right Click on the other device (TTL232R in this example) to bring up a menu as shown below:

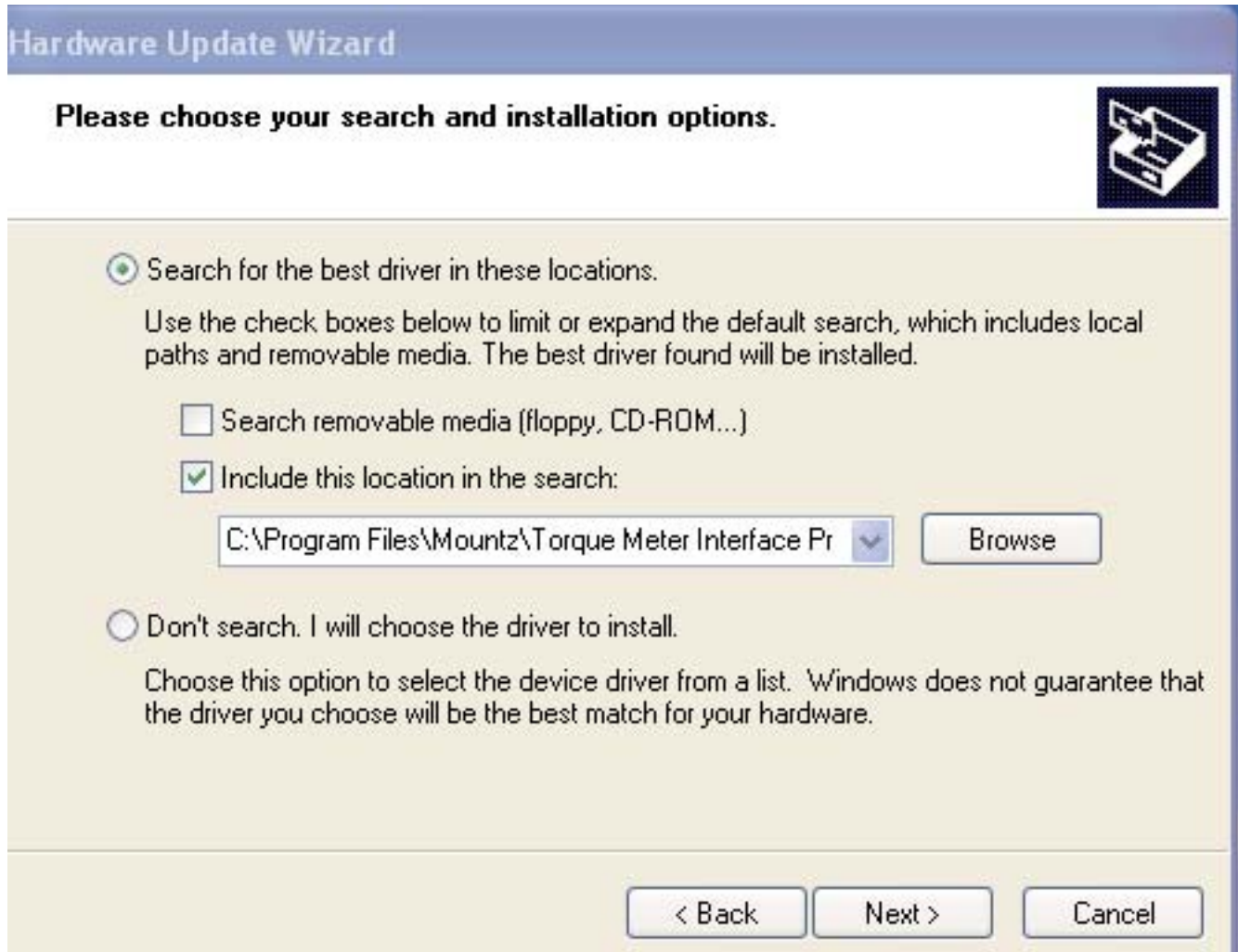


5) From the displayed menu select " Update Driver Software" to bring up the Device Driver wizard.

6) Select the second option "Install from a list or specific location (Advanced)"



- 7) Click on the Browse tab and browse to the specific location where the USB driver is located. The default directory (if the CD information is saved under the C drive under Program Files) is C:\program files\Mountz\Torque Meter Interface Program\USB Device Driver
- 8) Click next to begin the driver update process. A confirmation window will be displayed as soon as the installation has been completed successfully with a prompt to close the final installation window. Click close on the final confirmation window to complete the process.



The image shows a Windows-style dialog box titled "Hardware Update Wizard". The title bar is blue with the text "Hardware Update Wizard" in white. Below the title bar, the main area has a light beige background. At the top of this area, the text "Please choose your search and installation options." is displayed in bold black font. To the right of this text is a small icon of a USB drive. Below the text, there are two radio button options. The first option is selected, indicated by a filled circle. It is followed by the text "Search for the best driver in these locations." and a paragraph: "Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed." Below this paragraph are two checkboxes. The first checkbox is unchecked and is followed by the text "Search removable media (floppy, CD-ROM...)". The second checkbox is checked and is followed by the text "Include this location in the search:". Below the second checkbox is a text box containing the path "C:\Program Files\Mountz\Torque Meter Interface Pr" and a small downward arrow. To the right of the text box is a button labeled "Browse". Below the radio button options, there is a second radio button option that is not selected, followed by the text "Don't search. I will choose the driver to install." and a paragraph: "Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware." At the bottom of the dialog box, there are three buttons: "< Back", "Next >", and "Cancel".

Hardware Update Wizard

Please choose your search and installation options.

☒ Search for the best driver in these locations.

Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.

☐ Search removable media (floppy, CD-ROM...)

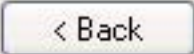
☒ Include this location in the search:

C:\Program Files\Mountz\Torque Meter Interface Pr 



☐ Don't search. I will choose the driver to install.

Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.

Tool Test Operation

The Tool Test mode contains the follow fields.

- A. Test Name
- B. Sensor Model
- C. Tool Serial No.
- D. Sensor Type
- E. Mode
- F. Units
- G. Filter
- H. Low Tolerance
- I. High Tolerance
- J. Auto-Clear Mode
- K. Auto-Clear Time
- L. Direction
- M. Comments
- N. Operator
- O. First Peak Sensitivity
- P. Minimum First Peak (% of full scale)

All tool tests must be entered using the PC Windows based Calibration Program. Once this is done the tests can be accessed using the "Tool Test" soft key on the LTT.

Entering data for the Tool Test is done using the PC Windows based Calibration Program. See the Screen above. Select the "Tool Tests" tab. Enter the relevant information on this screen such as the Test Name, which is the name by which the test will be identified on the LTT. Then enter all required information on the screen because once the tool test is activated on the LTT no changes can be made with the units, tolerances or other information. There is a field for comments to include user specific information. The torque sensor being used for the Tool Test must be identified. This is done to prevent a test being run on a torque sensor with an inappropriate range.

When entering the "Sensor Model" this must match with the sensor identification that was used to identify the torque sensor when it was calibrated. The case of alphanumeric characters will be ignored. If the transducer to be used for the test is connected you can click on the "Read" button next to the Sensor Model field and the field will be automatically populated. If you are not sure about how the transducer is identified, unplug the torque sensor from the LTT unit and plug it back in.



Note:

*the Sensor Model identification appears on the LTT screen during the initialization.

There are various control buttons to perform operations with this program, these include:

Save - Saves the Tool Test Setups on the PC so it can be used to run further tests in the future.

Open - Opens previously saved Tool Test Setups.

Send - Send a Tool Test to the LTT. It can store up to 5000 results total. Examples of combinations include 100 tests with 50 readings or 50 tests with 100 readings. Note that there is a maximum of 100 tool tests.

Delete Test in Meter - Clicking the "Delete Test in Meter" button brings up a screen that allows you to delete all of the Tool Tests stored in the meter or select the Tests you wish to delete. See the example on next page..

Clear Data in Meter - Clears the test data for this Tool Test in the LTT meter. Make sure to Download the Results before clicking this button. The operator will be asked for confirmation before the action takes place.


Online

Firmware Version: 1.06

Operator

Gordon

Tool Tests

Data


Tool Tests In Meter

Test Name:

Sensor Model:

Tool Serial No.:

Sensor Type:

Mode:

Units:

Filter:

	Delete	Test Name	Sensor Model	Tool Serial No.
1	☒	Test 5	SIM BOX	ABCD5
2	☒	Test 2	BMX-100i	ABCD2
3	☒	Test 3	BMX-100i	ABCD3
4	☒	Test 4	BMX-100i	ABCD4
5	☒	Test 6	BMX-100i	ABCD6

The Tool Test also supports Load Cells in Peak mode. See the screen shot below as an example of a Tool Test using a Load Cell.

Connectors for connecting the LTT to Load Cells are available from Mountz. These are pre-wired except for the Load Cell connections. They are:

Connector	Mountz Part Number
-----------	--------------------

For 2mV/V Load Cells	072008
----------------------	--------

For 4 mV/V Load Cells	072009
-----------------------	--------

The screenshot displays the 'Mountz Torque Meter Interface Program' window. At the top, it shows 'Online' status, 'Firmware Version: 1.06', and 'Operator: Gordon'. The 'Tool Tests' tab is selected, showing various configuration fields. On the left, there are fields for 'Test Name' (Load 4), 'Sensor Model' (Force 100 kN), 'Tool Serial No.' (A457689G), 'Sensor Type' (Force Sensor), 'Mode' (Peak), 'Units' (kN), 'Filter' (500 Hz), 'Low Tolerance' (55.000), 'High Tolerance' (65.000), 'Auto Clear Mode' (Automatic), 'Auto Clear Time' (4), and 'Direction' (Both). A 'Read' button is next to the 'Sensor Model' field. In the center, there are sections for 'First Peak Mode' (Sensitivity: High, Min. First Peak: 10), 'Angle Setup' (Angle Threshold: 0.25 degrees, Angle Polarity: Normal, Angle Encoder: 360), and 'Torque+Angle Mode' (Angle Threshold: 2.00 degrees, Torque Threshold: 2.000, Allow Angle Ratchet: No). On the right, there are buttons for 'Open', 'Save', 'Send', 'Delete Test In Meter', 'Download Results', and 'Clear Data In Meter'. A 'Require Comments' checkbox is also present. At the bottom, there is a 'Bolt Audit Mode' section with 'Initial Threshold' and 'Final Threshold' both set to 0.000. A 'Comments' text area is at the bottom left.

Mountz Torque Meter Interface Program

File

Online Firmware Version: 1.06 Operator: Gordon

Tool Tests | Data Logging | Sensor Calibration | Meter Calibration | Meter Configuration

Test Name: Load 4

Sensor Model: Force 100 kN Read

Tool Serial No.: A457689G

Sensor Type: Force Sensor

Mode: Peak

Units: kN

Filter: 500 Hz

Low Tolerance: 55.000

High Tolerance: 65.000

Auto Clear Mode: Automatic

Auto Clear Time: 4

Direction: Both

First Peak Mode

Sensitivity: High

Min. First Peak (% of full-scale): 10

Angle Setup

Angle Threshold: 0.25 degrees

Angle Polarity: Normal

Angle Encoder: 360

Torque+Angle Mode

Angle Threshold: 2.00 degrees

Torque Threshold: 2.000

Allow Angle Ratchet: No

Bolt Audit Mode

Initial Threshold: 0.000

Final Threshold: 0.000

Require Comments

Open

Save

Send

Delete Test In Meter

Download Results

Clear Data In Meter

Comments:

Using the Tool Tests on the LTT

Once 1 or more tool tests are sent to the LTT meter the operator can press the "Tool Test" soft key on the LTT and following Menu choices will appear:

Select
Quick Test
Start
Stop
Clear Memory

Peak	1500 Hz
33.785 lbf.in	
Menu	Tool Tests

Choose the function desired, from the menu list, by using the **Up /Down** keys and use **Enter** key to finalize the selection highlighted in reverse video.

Select is used to select the desired test from a list of tests that have been downloaded. When an operator selects this he/she will view an introduction for 3 seconds that provide directions, and then this will display:

Choose Tool Test from List of available tests.
Use **Up /Down** keys to toggle between tests.
Use **Enter** to select test.

After the short introduction the operator will see the tool tests displayed and can select the desired test.

Quick Test: By selecting Quick Test the operator can run a quick test using the currently selected parameters of the meter such as Mode, Units, and Tolerance etc. After selecting Quick Test, Press the Enter key. The test starts immediately and the operator can start collecting data. Once the operator collected the number of reading desired then press the Tool Test "soft" button that now reads Quick Test. Then the operator can select Stop to end the test.

When the operator connects to the Interface Program and click on Download Results, the Quick Test data is downloaded. The file name will be Quick Test with associated Date and Time. If the operator performs several different Quick Tests he/she will have different Time and/or Date files for each test.

Start begins collecting test data. The tool name will be followed by a colon and then the number of data points collected.

Stop ends the test. This is required as some users may want to collect 10 data or others may want to collect 25 points or more.

Clear Memory allows the test points to be cleared in the meter itself. The operator will be asked for confirmation before the action takes place. This function should only be used if the readings have been downloaded to the PC or test data is invalid for some reason.

Once all desired tests are run the operator can return to the PC to download all Tool Tests stored in the LTT. If they choose to add comments they can do so by checking the "Require Comments" check box. During a particular test download the operator will be given the opportunity to add further notes to the file stored on the PC.

An example of a Tool Test Result file (image - right)

There is an optional Excel Add-In included on the LTT CD to perform Real-Time data acquisition into an open Excel spreadsheet. It also includes Tabs for performing statistical analysis on the data in the spreadsheet. Follow the instructions in the read me file, in this folder, to use this Add-In.

	A	B	C	D	E	F
1	Test Name: TSC45-A					
2	Test Time: 01-01-00 00:00:80					
3	Sensor Serial No.: 05-06-013					
4	Starting Datapoint: 1					
5	# of Datapoints: 15					
6	Comments:					
7						
8	34.737					
9	34.298					
10	34.794					
11	34.585					
12	34.155					
13	34.337					
14	34.346					
15	34.308					
16	34.810					
17	34.585					
18	34.716					
19	34.444					
20	34.117					
21	34.508					
22	34.335					
23						
24						
25						

Angle Test Operation

The screenshot shows the 'Mountz Torque Meter Interface Program' window. At the top, it indicates 'Online' status, 'Firmware Version: 1.07', and 'Operator: Gordon'. The 'Angle Tests' tab is selected, showing four configuration panels: 'Angle Setup' (0.250 degrees threshold, Normal polarity, 360 encoder), 'Torque+Angle Mode' (2.000 degree threshold, 2.000 torque threshold, No ratchet), 'Bolt Audit Mode' (0.000 initial/final torque thresholds), and 'Spindle Audit Mode' (0.000 degree thresholds).

All angle tests must be entered using the PC Windows based Calibration Program. Once this is done the tests can be accessed using the soft key on the LTT.

Entering data for the Angle Test is done using the PC Windows based Calibration Program. See the Screen above. Select the "Angle Tests" tab. Enter the relevant information on this screen as needed for type of angle test that will be used.



Note:

* The Bolt Audit Mode is an additional feature that is only available with LTT Bolt Audit model (Item # 072995)

Angle Set-Up

- A. Angle Threshold
- B. Angle Polarity
- C. Angle Encoder

Torque+Angle Mode

- A. Angle Threshold
- B. Torque Threshold
- C. Allow Angle Ratchet

Bolt Audit Mode

- A. Initial Torque Threshold
- B. Final Torque Threshold

Spindle Audit Mode

- A. Initial Torque Threshold
- B. Low Angle Threshold
- C. High Angle Threshold

Bolt Audit Explanation

This feature is designed for auditing the torque applied to a fastener for a test such as determining relaxation after a fastener has been tightened. An initial and final torque threshold is entered into the bolt audit mode fields. As an example the initial torque value could be 70% of the desired torque on the fastener and the final torque would be the nominal value for which the fastener was previously tightened. In this case, if the nominal torque is 500 lbf.ft, the initial torque threshold would be entered as 350 lbf.ft, 70% of the nominal value.

The purpose of the bolt audit function is to report the degree of movement from the initial torque threshold to the final torque threshold. The torque analyzer will display the final torque threshold and the total angle displacement, which has occurred from the initial torque threshold and final torque threshold.

Spindle Audit Explanation

1. Spindle Free Test:

The operator turns on the tightening spindle and the spindle starts rotation, the LTT begins to count angle immediately, and when the spindle stops, the LTT will display and record the final angle, and final peak torque. Set up the initial values. The Initial Torque should be entered as zero so that the Angle will begin to be counted as soon as the spindle starts moving.

2. Spindle within required tolerance:

Set up the initial values such as the Initial Torque, the Low Angle Threshold and the High Angle Threshold. An example would be a Torque of 15 N.m, Low Angle Threshold of 40 degrees and a High Angle Threshold of 50 degrees.

When the tightening spindle reaches 15 N.m, the Angle begins to be counted. If the spindle stops between 40-50 degrees, the LED shows green, and the display shows the final Angle and the final Torque.

If the spindle stops before reaching 40 degrees the LED will show red and the display shows the final result.

If the spindle stops after exceeding 50 degrees the LED will show red and the display shows the final result.

The screenshot displays the 'Mountz Torque Meter Interface Program' window. At the top, it shows 'Online' status with a green circle, 'Firmware Version: 1.07', and 'Operator: Gordon'. Below this is a tabbed interface with 'Angle Tests' selected. The 'Angle Tests' tab contains four sub-sections: 'Angle Setup' with 'Angle Threshold' (0.250 degrees), 'Angle Polarity' (Normal), and 'Angle Encoder' (360); 'Torque+Angle Mode' with 'Angle Threshold' (2.000 degrees), 'Torque Threshold' (2.000), and 'Allow Angle Ratchet' (No); 'Bolt Audit Mode' with 'Initial Torque Threshold' (0.000) and 'Final Torque Threshold' (0.000); and 'Spindle Audit Mode' with 'Initial Torque Threshold' (0.000), 'Low Angle Threshold' (0.000 degrees), and 'High Angle Threshold' (0.000 degrees).

Torque Sensor Calibration

Torque Sensor Calibration should only be performed by an operator with the necessary calibration wheels or arm and weight sets or by a calibration lab. Mountz offers calibration services to perform this function.

LTT calibrations are done in conjunction with a PC Windows based Calibration Program. The program is easy to use and guides the user through the calibration steps.

Once the program is started and connected to the LTT meter, a button **"Start"** is provided to start the calibration. All the needed information must be entered in the appropriate text boxes. This includes information such as the Sensor Model, Serial Number, the Full Scale torque value, the units of calibration and the transducer type (Bridge or Brushless). There is also a Scroll box to allow setting of the Calibration Interval. The default is 6 months but that can be changed. Once all required information is entered, the Start button is clicked, and its function changes to "Continue" as shown in figure below and procedural information will be given in the large text box. A 2-point calibration should work well in all but exceptional circumstances.

Once the calibration is complete the calibration data will be stored in a Mountz "Smart" torque sensor using the ARCII protocol. For non-smart torque sensors the calibration data will be stored in the LTT internal memory. A sophisticated error correction algorithm assures that the data written to and retrieved from memory is always correct. Once the calibration is finish, Torque Values will be displayed in the Torque Window allowing for verification of calibration data points.

The "Delete Device" option allows the ability to delete non-smart sensors or transducers records from the LTT Torque Analyzer. In order to delete the device record for a non-smart sensor, the non smart sensor or transducer must be connected to the LTT Torque Analyzer. Ensure the LTT Torque Analyzer is powered on. Connect the non-smart device to the LTT. Use the scroll up or scroll down arrows on the keypad of LTT to locate the device to be deleted. Press enter on the LTT keypad to complete the selection. Launch the torque meter interface program and go to the Sensor Calibration tab. Press "the Read From Sensor" tab located just above the "Delete Device" tab to read in the device information. A Calibration Data window should appear with details of the non-smart device. Click on exit to exit the Calibration Data window. Please ensure to validate the details displayed on the screen to ensure the selection is as desired, as the "Delete Device" function will delete the device record. A non-smart device can only be added back in by going through the calibration process. Press the "Delete Device" tab to remove the device record for the non-smart device. If there is a need to delete multiple non-smart devices, the above steps must be repeated for each non-smart device.

The screenshot displays the 'Sensor Calibration' tab of the LTT Torque Analyzer software. The interface includes several sections for data entry and control:

- Navigation Tabs:** Tool Tests, Angle Tests, Data Logging, **Sensor Calibration**, Meter Calibration, Meter Configuration, Remote Tool Tests.
- Sensor Type:** Radio buttons for Torque Sensor (selected) and Force Sensor.
- Torque Sensor Type:** Radio buttons for Bridge (selected), Brushless, Internal, and a checkbox for Angle Transducer.
- Calibration Type:** Radio buttons for Compression/CW Torque, Tension/CW Torque, 2 Point Calibration (selected), 3 Point Calibration, and Both.
- Input Fields:** Sensor Model (BMX100i), Serial No. (72405), Full Scale (100), Units (Lbf.in), Cal. Interval (months) (6).
- Buttons:** Read, Read From Sensor, Delete Device, Update, Start, Print, Mux.
- Display Area:** Torque (black box), A/D Counts (displaying a green '+' sign), and a large text box with the instruction: "Fill in sensor information and then press Start button to begin calibration".
- Table:** A table with 12 columns for calibration parameters: Pos. Offset 1, Pos. Slope 2, Pos. Offset 2, Pos. Breakpoint, Neg. Slope 1, Neg. Offset 1, Neg. Slope 2, Neg. Offset 2, Neg. Breakpoint, Pos. Deadband, Neg. Deadband, and Zero Point.

Note for Force & Load Sensors

When performing a Load Cell Calibration, if choosing a 2 point calibration, load at 10% and 100%. If performing a 3 point calibration and load at load at 10%, 50% and 100%.

The calibration program will guide you through the calibration by text in the information box. By selection in the Calibration Type you can select Compression Only, Tension Only or Both if the Load cell supports this. Type in the appropriate Full Scale value and select the units desired.

The "Delete Device" option allows the ability to delete non-smart sensors or transducers records from the LTT Torque Analyzer. In order to delete the device record for a non-smart sensor, the non smart sensor or transducer must be connected to the LTT Torque Analyzer. Ensure the LTT Torque Analyzer is powered on. Connect the non-smart device to the LTT. Use the scroll up or scroll down arrows on the keypad of LTT to locate the device to be deleted. Press enter on the LTT keypad to complete the selection. Launch the torque meter interface program and go to the Sensor Calibration tab. Press "the Read From Sensor" tab located just above the "Delete Device" tab to read in the device information. A Calibration Data window should appear with details of the non-smart device. Click on exit to exit the Calibration Data window. Please ensure to validate the details displayed on the screen to ensure the selection is as desired, as the "Delete Device" function will delete the device record. A non-smart device can only be added back in by going through the calibration process. Press the "Delete Device" tab to remove the device record for the non-smart device. If there is a need to delete multiple non-smart devices, the above steps must be repeated for each non-smart device.

The screenshot displays the LTT Torque Analyzer software interface, specifically the Sensor Calibration tab. The interface includes a status bar at the top with an "Online" indicator, "Firmware Version:" label, and an "Operator" field containing "Homer Simpson". Below this is a navigation bar with tabs: "Tool Tests", "Angle Tests", "Data Logging", "Sensor Calibration" (selected), "Meter Calibration", "Meter Configuration", and "Remote Tool Tests".

The main calibration area contains several sections:

- Sensor Type:** Radio buttons for "Torque Sensor" (selected) and "Force Sensor".
- Torque Sensor Type:** Radio buttons for "Bridge" (selected), "Brushless", "Internal", and a checkbox for "Angle Transducer".
- Calibration Type:** Radio buttons for "Compression/CW Torque", "Tension/CCW Torque", "Both" (selected), "2 Point Calibration" (selected), and "3 Point Calibration".
- Read From Sensor:** A button to read sensor data.
- Delete Device:** A button to delete the device record.
- Torque:** A large black display area.
- A/D Counts:** A display showing a green "+" sign and a green "0".
- Sensor Model:** A text field containing "Load Cell" and a "Read" button.
- Serial No.:** A text field containing "72405" and a "Read From Sensor" button.
- Full Scale:** A text field containing "100" and a "Lbf.in" unit dropdown.
- Cal. Interval (months):** A text field containing "6" and an "Update" button.
- Start:** A button to begin calibration.

Below the calibration area is a large text box with the instruction: "Fill in sensor information and then press Start button to begin calibration".

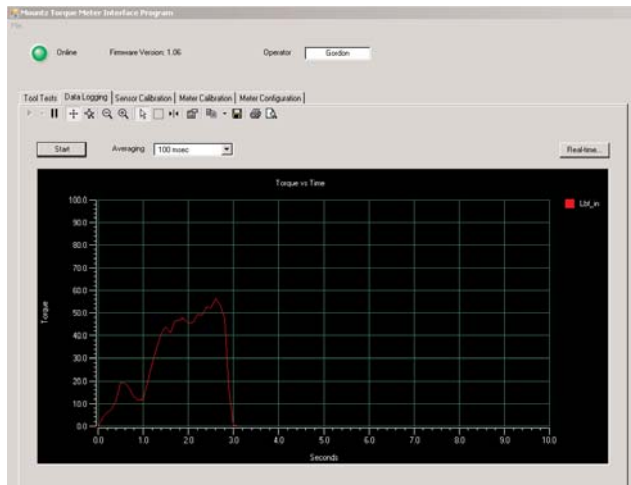
At the bottom, there is a table with 13 columns for sensor parameters:

	Pos. Offset 1	Pos. Slope 2	Pos. Offset 2	Pos. Breakpoint	Neg. Slope 1	Neg. Offset 1	Neg. Slope 2	Neg. Offset 2	Neg. Breakpoint	Pos. Deadband	Neg. Deadband	Zero Point

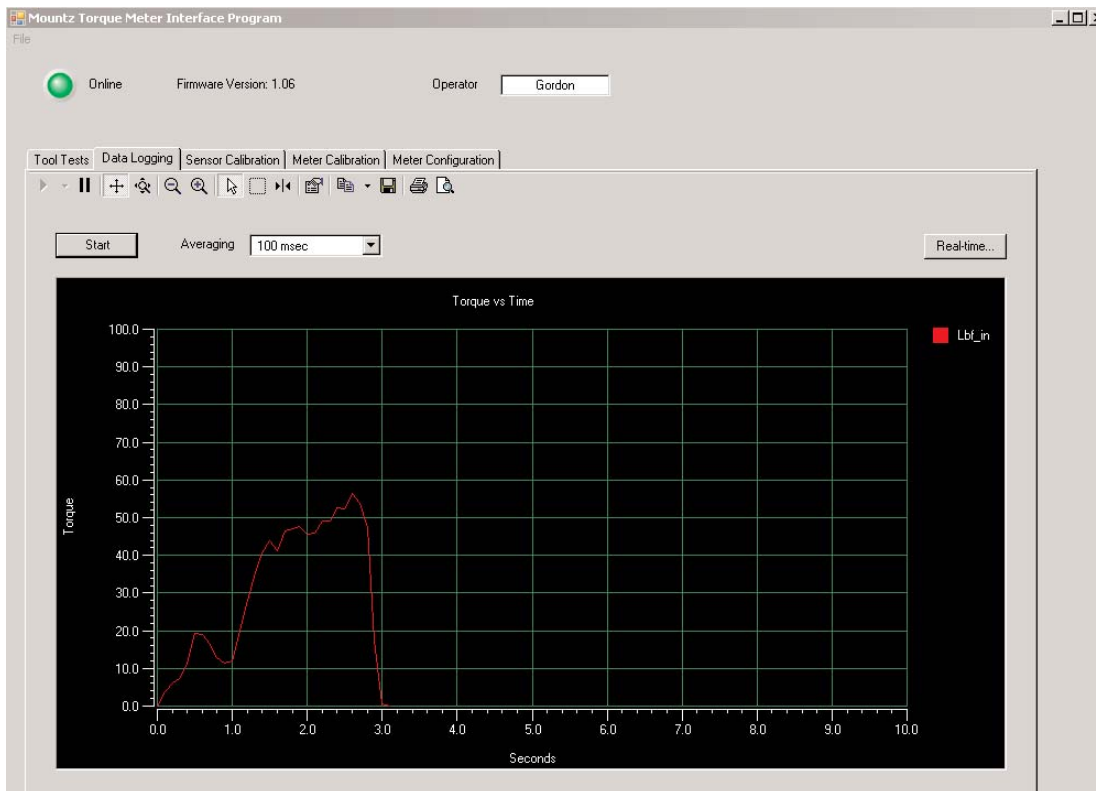
Below the table is a "Print" button and a "Mux" button.

Data Logging

This program is used for graphing the data. This feature can be utilized to evaluate and confirm torque specifications in both production or R & D environments.



When the graph first appears you can enlarge it by clicking on the Zoom-Box, which is the square box made up of dashed lines just to the right of the big arrow. Then drag the cursor to surround the small graph and the view will expand the graph as shown.



The LTT interface program contains a Tab for Data Logging. The actual plot on the Screen is Torque vs. Time. If you have an Angle enabled transducer the Torque and Angle data will be collected in a .csv file. The data collection begins when you click the "Start" button and ends when you click the same button which changes to "Stop" after the data collection begins. The data collected is saved in the PC. The actual file path is as follows: **Computer>Local Disk(C)>Users>User Profile Name>AppData>Roaming>Mountz>Mountz Torque Meter Interface Program>Program File Version>Tool Test Results>Operator Name**

If you use this function frequently you probably will want to create a shortcut to this folder.

The .csv file can be opened using Excel. You can use Excel to plot this data in a variety of formats or by using other Windows based tools of your choice. There is also an Excel Spreadsheet with a Macro as an example of Plotting Torque and Angle. This is available on the LTT CD in the folder Excel Macro for Torque and Angle. Open this Excel file, highlight the Torque and Angle data, click the Graphing Icon that is on the spreadsheet, the Torque and Angle will be plotted for you. If you have your own Torque and Angle data you can just replace the example data with your own, highlight it and click the Graphing Icon to plot it.

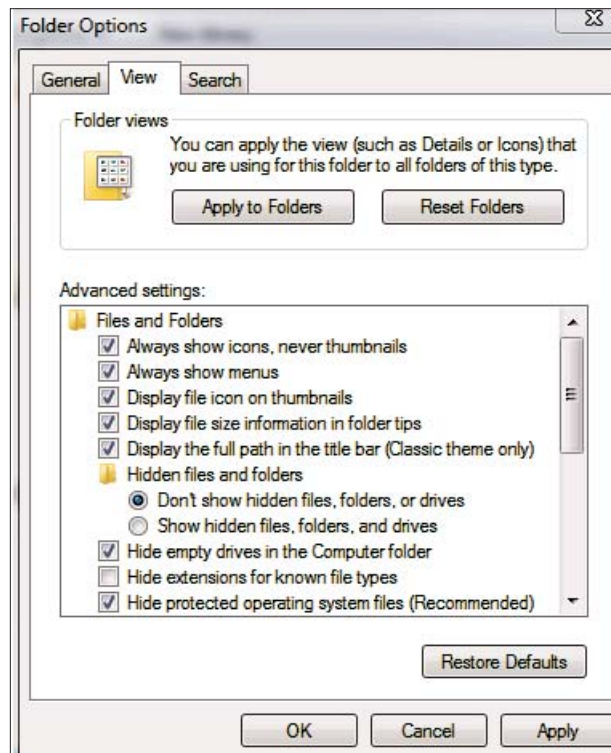
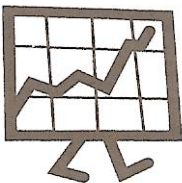
This Spreadsheet gives an example of Plotting Torque and Angle Values. Simply highlight the cells containing the values of Angle and Torque and click on the Graphing Icon (below).

If you have collected Torque and Angle values, using the LTT Data Logging Program, you can use this Template to Plot Torque and Angle. Simply substitute your own values for those on the left.

The data collected is saved in the PC. The actual path is as follows: **Computer>Local Disk(C)>Users>User Profile Name>AppData>Roaming>Mountz>Mountz Torque Meter Interface Program>Program File Version>Steaming Data Files>Operator Name**

By default, the setting for Hidden files and folders is "[Don't show hidden files, folders and drives](#)". This setting must be changed for the users hidden files and folders to enable visibility via Windows Explorer, otherwise all user hidden files and folders will not be visible

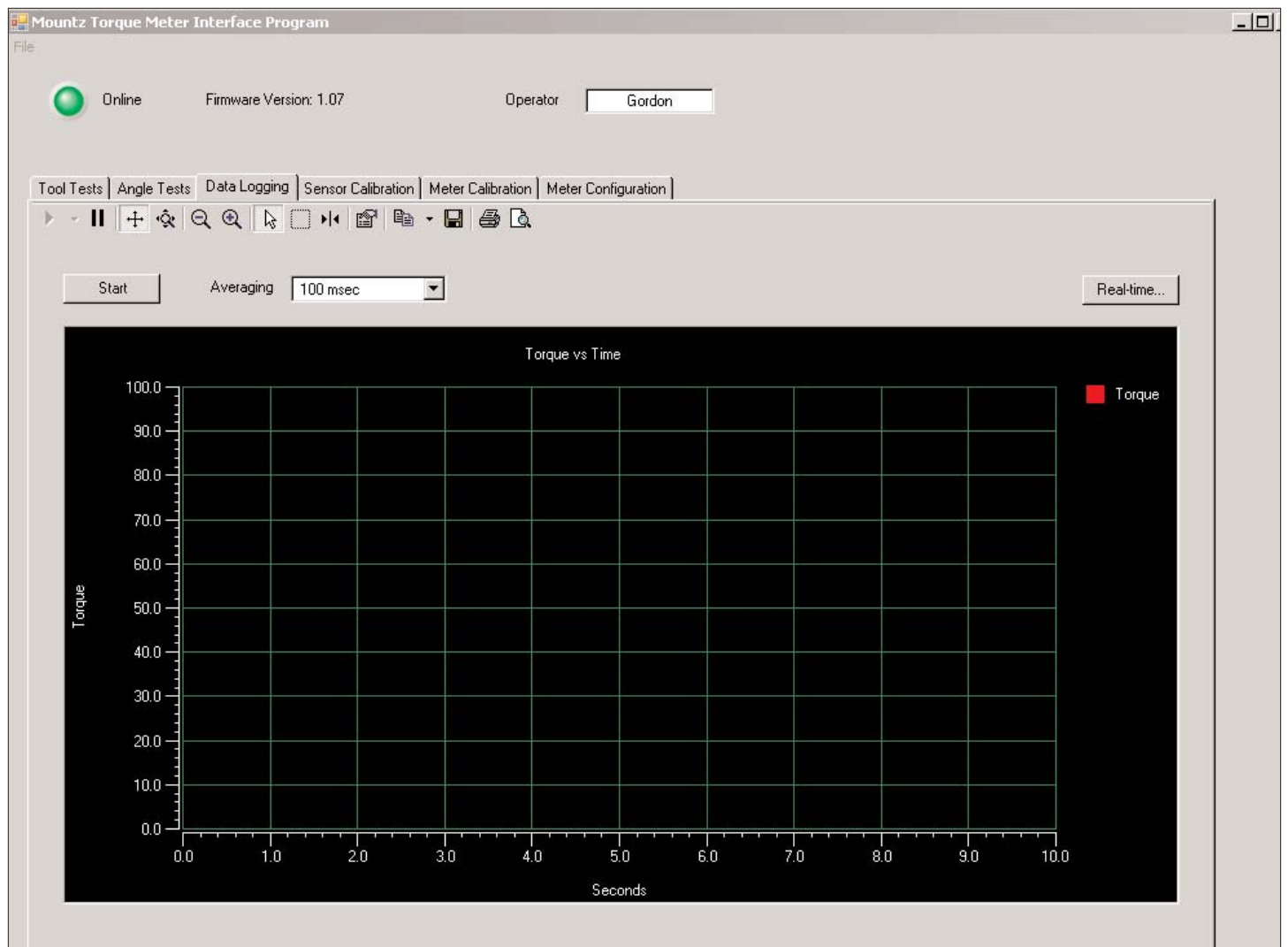
1. Launch Windows Explorer
2. Go to Computer>Local Disk(C)>Users>User Profile Name
3. Highlight the desired profile name
4. Go to Organize
5. Select folder and search options
6. Select the View Tab, change option to "[Show hidden files, folders and drives](#)"
7. Click on Apply to apply the changes



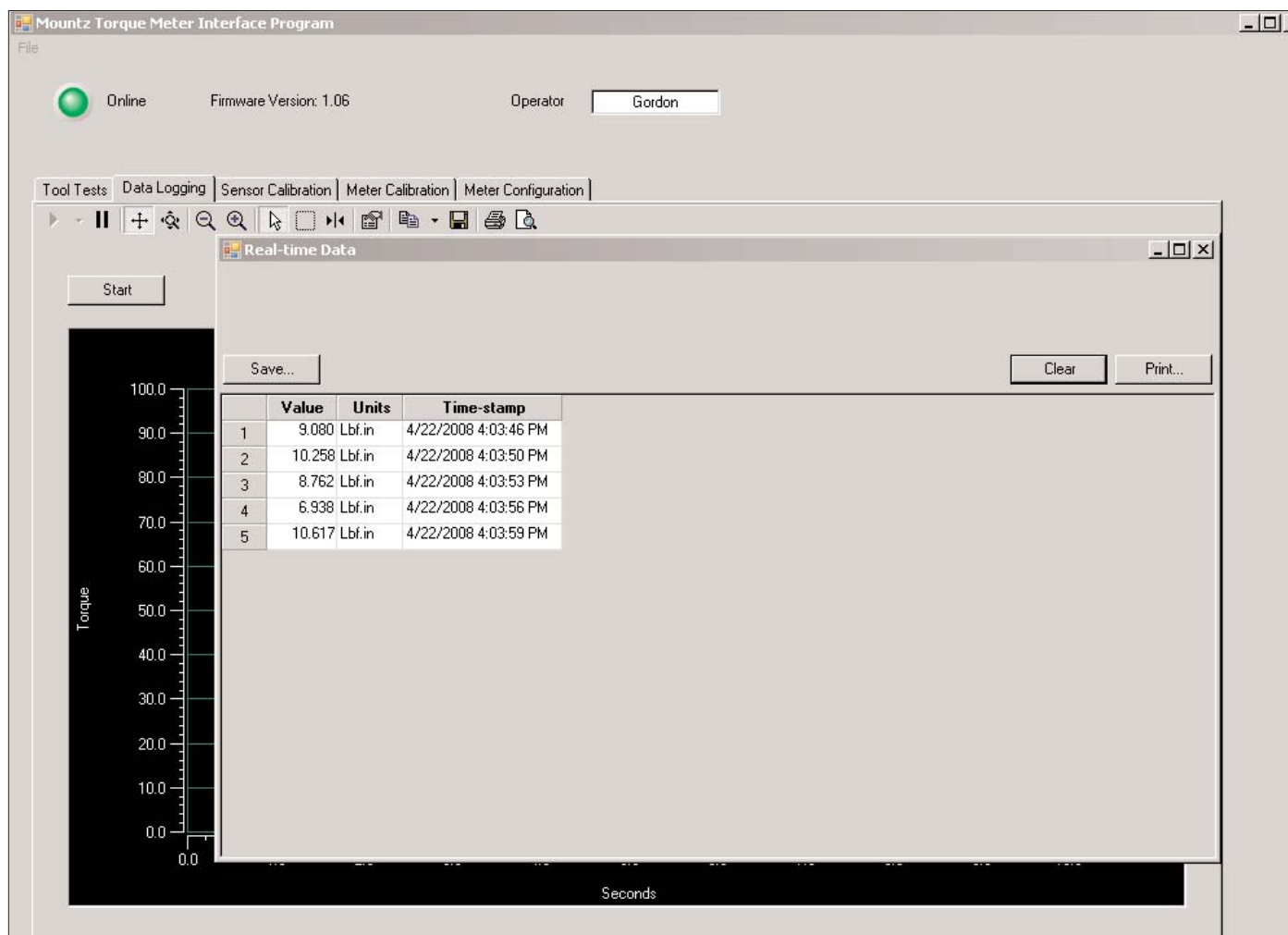
Angle	Torque
6	3.64
21	3.62
36	3.63
137	4.34
153	3.99
167	4.05
182	4.23
196	4.30
211	4.13
225	3.74
240	3.99
254	4.32
269	4.52
283	4.31
298	4.01
313	4.18
327	4.38
342	4.23
356	3.95
371	3.74
385	3.99
400	4.13
414	4.15
429	4.19
444	4.13
458	3.88
473	3.90
488	4.09
503	4.01
517	3.77
532	3.79
547	4.31
561	4.26
576	4.22
591	4.05
605	3.91
620	3.86

The Real-Time button on the Data Logging screen allows a user to connect the LTT to a PC and get readings sent to the PC, in Real-Time, which can be printed to a printer or saved as an Excel Spread Sheet. The screen reading is sent from the LTT when Auto clear takes place or when Enter is pressed if the meter is in Manual Clear mode.

Open the Torque Meter Interface program and choose the Data Logging Screen.



You will see there is a button on the right side of the screen, above the graph area, labeled "Real-time...", see the Figure below. Clicking this button will open another Window used to collect the Real-Time data. See the Figure below for a screen shot of this Window.



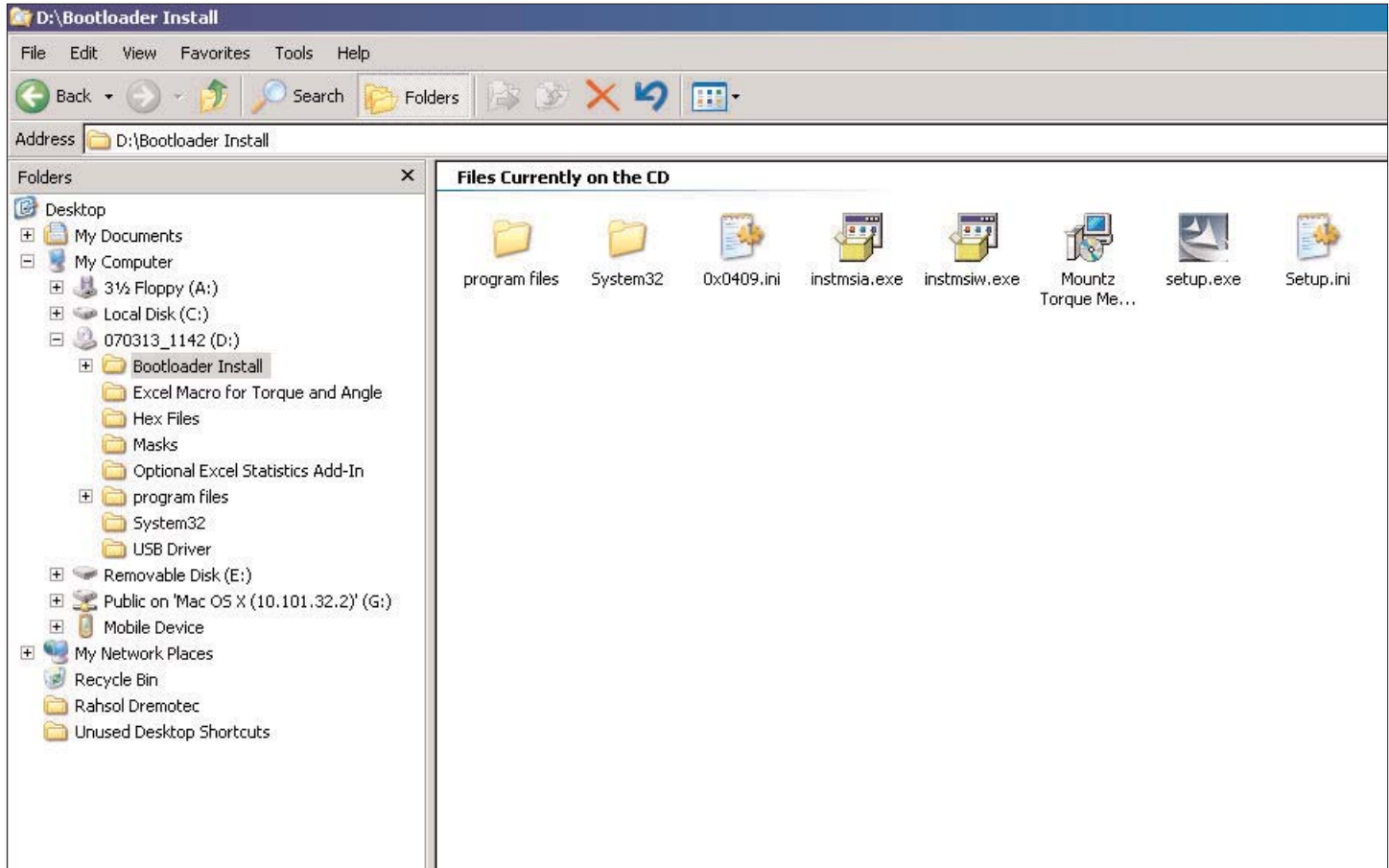
Below is an example of the Excel file created if the Real Time data is saved.

The screenshot shows a Microsoft Excel spreadsheet titled 'Real Time Example.xls'. The data is organized as follows:

	A	B	C	D	E
1	Value	Units	Time-stamp		
2	9.080	Lbf.in	4/22/2008 4:03:46 PM		
3	10.258	Lbf.in	4/22/2008 4:03:50 PM		
4	8.762	Lbf.in	4/22/2008 4:03:53 PM		
5	6.938	Lbf.in	4/22/2008 4:03:56 PM		
6	10.617	Lbf.in	4/22/2008 4:03:59 PM		
7					
8					

Torque Meter Bootloader

This program is used to update the code in the LTT unit. This program does not automatically install as the Interface Program does. The following assumes the operator has the supplied CD in the D: drive. Locate the Bootloader Install folder on your computer as shown below.



Open the Bootloader Install Folder and run the Setup.exe file by right clicking on it and choosing "Open". The Installation Program will automatically put a "Torque Meter Bootloader" Icon on your desktop.

When the operator runs the program he/she will see a window as shown below. Connect the USB cable to the LTT and the computer and turn on the LTT unit. Click the button "Start boot loader on device". Both LED's on the LTT will turn on and the screen will indicate the LTT is in bootloader mode.

To update the firmware click the "Boot load HEX file to device.." button. Locate the HEX file update. It will be in the Hex Files folder. The file is named Mountz App.hex. This is the current application so there is no need to update but if the operator chooses he/she can reload it to see how this feature works. The process will take about 6 minutes as there is quite a lot of code in the product. The status will be shown in the LTT Boot Loader window as the process takes place.

As updates are available these will be available on the Mountz Web site.



Bar Code Reader (Accessory Item)

The Bar Code Reader is an optional accessory for the LTT. It is designed for users that want the ability to scan Bar Codes on Tools and start Tool Tests automatically. This option reduces set-up time for users with a large number of Tool Tests stored in the LTT. The Bar Code Reader is powered by the LTT so no additional power source is required. This feature is designed to use a specific bar code reader, which is modified to operate with the LTT.

The LTT is designed with an expansion port, which is accessed by a "punch-out" on the back of the unit. This allows users to easily connect to a PLC for access to GO or NO-GO signals and similar applications.

Note: Starting April 2007, LTT models can be used with this Bar Code Reader. The expansion port on the back of the LTT allows a Bar Code reader to be connected to the LTT.

Mountz LTT units with serial numbers that start with digits "07" and later feature a new firmware and hardware. Only models with serial numbers 07-01-001 or later can operate with the Bar Code Reader of Multiplexer. Prior LTT versions cannot support the Bar Code Reader and Multiplexer. Firmware and revision data can be seen on initial power on of unit.

Customers with older LTT versions can send their unit to our service department and pay for it to be upgraded to operate with the Bar Code Reader.

Model: Bar Code Reader
Item # 072997

Operation with a Bar Code Reader

The Bar Code Reader is connected, using the supplied cable, to the access port on the back side of the LTT analyzer.

This feature is designed to be a supplement to the Tool Tests used with the Analyzer. The user must enter a Test Name, the Sensor Model Required, and a Tool Serial Number.



1. The Test Name can be anything but is recommended to keep it short due to limited space on the Analyzer Display.
2. The Sensor Model is the transducer required for the test, it must be entered exactly as displayed on the Analyzer Display when it is connected or it will not be recognized as the correct Sensor.
3. The Tool Serial Number is entered as an alpha numeric value. This value is printed below the bar code, which would be affixed to the Tool being tested.

Shown on next page is an example Tool Test Screen. After entering the required data the Test would be sent to the Analyzer using the Send button on the right hand side of the screen. The Tool Test should also be saved on the PC for future reference.

File

Online Firmware Version: 1.04b Operator: Tim Smith

Tool Tests | Data Logging | Sensor Calibration | Meter Calibration

Test Name: MICRO-50

Sensor Model: BMX-50i

Tool Serial No: A67T234

Sensor Type: Torque Sensor

Mode: Peak

Units: Lbf.in

Filter: 3000 Hz

Low Tolerance: 18.800

High Tolerance: 21.200

Auto-clear Mode: Automatic

Auto-clear Time: 2

Direction: Both

Angle Polarity: Normal

First Peak Mode

Sensitivity: Medium

Min. First Peak (% of full-scale): 10

Audit Mode

Angle Threshold: 2.00 degrees

Torque+Angle Mode

Angle Threshold: 2.00 degrees

Torque Threshold: 0.000

Allow Angle Ratchet: No

Open...

Save...

Send

Delete Test In Meter...

Download Results

Clear Data In Meter...

Comments

Once the Tool Test or Tool Tests are loaded into the analyzer, the Tool Test can be selected by scanning the bar code rather than selecting the test using the menu on the Analyzer. Press the Tool Test "Soft" key (the middle key below the display) once and then press Enter. You will hear 3 short beeps and the bar code reader will be activated. This activation sequence is required as powering the reader at all times would significantly shorten the battery life. Once the bar code reader is activated pull the trigger while aiming the laser beam at the Tool bar code. After the bar code is read the appropriate Tool Test is automatically started. If the bar code scanned does not match any of the Serial Numbers in the Tool Tests, the Analyzer will display "No Tool Test Defined for xxx". After collecting the required number of readings, press the Tool Test "Soft" key to stop the test

Using the Bar Code Reader with Multiplexer

The Bar Code Reader can be used combined with the optional 4-Port Multiplexer. A more complete description of the Multiplexer and its features are provided on page 40. This combination provides a flexible, time saving solution that reduces the potential for operator error. For users that have many Tool Tests and using multiple torque transducers, these two accessories is the ideal solution for torque testing.

Example of using the Bar Code Reader and Multiplexer.

The user enters a Tool Test that includes one of the Transducers connected to the Multiplexer. In addition they enter the Serial Number of the Tool to be tested. This Serial Number is bar coded on the Tool to be tested. This Tool Test is downloaded to the Analyzer. Now when the Bar Code of the Tool is scanned the Analyzer automatically selects the correct transducer by using the Multiplexer and starts the appropriate Tool Test.

Multiplexer (Accessory Item)

The Multiplexer is an optional accessory for the LTT. It allows users to connect 1-4 torque sensors to the Torque Analyzer simultaneously. The device eliminates the need to plug and unplug torque sensors. The LTT powers the Multiplexer so no additional power source is required.

Note: Starting April 2007, LTT models can be used with this Multiplexer.

Mountz LTT units with serial numbers that start with digits "07" and later feature a new firmware and hardware. Only models with serial numbers 07-01-001 or later can operate with the Bar Code Reader of Multiplexer. Prior LTT versions cannot support the Bar Code Reader and Multiplexer. Firmware and revision data can be seen on initial power on of unit.

Customers with older LTT versions, can send their unit to our service department and pay for it to be upgraded to operate with the Multiplexer.



Model: Multiplexer
Item # 072998



Note: When calibrating torque sensors, perform this operation with the torque sensor connected directly to the LTT and not connected through the Multiplexer.

Operation with the Multiplexer (Mux)

When the Analyzer is connected to the Multiplexer and powered on it reviews the Multiplexer (Mux) to determine what torque sensors are connected and downloads the identity and calibration data for each of the attached torque sensors.

The "Soft" key on the right hand side will indicate the currently selected Mux port such as Mux 1, Mux 2 etc. In addition, an LED on the right side of the torque sensor connection to the Mux will light-up indicating which torque sensor is currently selected.

Selecting Transducer Manually

1. Press the Mux "Soft" key and it will provide a list of currently connected torque sensors.
2. The user can scroll through the list torque sensors and press Enter to select a model.

Selecting a Torque Sensor Automatically

An automatic transducer selection is available.

1. A Tool Test is entered that includes one of the torque sensors connected to the Mux and this Tool Test is sent to the Analyzer.
2. Now when the Tool Test is selected on the LTT, the analyzer automatically connects to the required torque sensor using the Mux. This reduces operator error of accidentally selecting the wrong torque sensor for a tool test.

The Multiplexer can be used with the optional Bar Code Reader. A more complete description of the Bar Code Reader is on page 35. This combination provides a flexible, time saving solution that reduces the potential for operator error. For users that have many Tool Tests and using multiple torque sensors, these two accessories is the ideal solution for torque testing.

Example of using the Bar Code Reader and Multiplexer.

The user enters a Tool Test that includes one of the torque sensors connected to the Mux. In addition they enter the Serial Number of the Tool to be tested. This Serial Number is bar coded on the Tool to be tested. This Tool Test is downloaded to the Analyzer. Now when the Bar Code of the Tool is scanned the Analyzer automatically selects the correct torque sensor by using the Mux and starts the appropriate Tool Test.

Force & Load Sensors

Starting April 2007, LTT models can be used with Force & Load sensors.

Note: Mountz LTT units with serial numbers that start with digits "07" and later feature a new firmware and hardware. Only models with serial numbers 07-01-001 or later can operate with the Force & Load sensors. Prior LTT versions cannot support the Bar Force & Load sensors. Firmware and revision data can be seen on initial power on of unit.

Customers with older LTT versions, can send their unit to our service department and pay for it to be upgraded to operate with load & force sensors.

Using LTT 2000 as a Force Measurement Meter

The LTT recognizes standard or ARCII equipped force sensors (load cells). The active modes of operation for force are TRACK & PEAK. Descriptions of these modes are found in this manual (see page 8).

ARCII equipped sensors incorporate a small chip that allows for automatic sensor recognition (see page 14). This feature identifies the sensor, all calibration data and a calibration date reminder. This chip can be added to the connection cable to enable the features of the ARCII technology.

The SET UP mode allows users to define how the LTT operates, including setting of the Clock. Three modes that are irrelevant to Force are Angle, T+A Threshold and First Peak (these are Torque Only selections).

The LTT only supports 2 units of measure when connected to a force or lead sensor. Those units are kN or Lbf.

Force sensors can be used in 3 directions. Clockwise (Compression), Counter Clockwise (Tension) or Both can be selected in the Setup mode. (See page 15) for setting direction.

The included software program Mountz Torque Meter Interface Program (MTIP) has functions for Tool Tests, Data Logging, Sensor and Meter Calibration. For calibration of Force sensors, select the sensor type Force.

For Tool Test you can define a type of parameter criteria, including tolerance settings for a specific function. (See page 18 for setting up Tool tests). For questions related to Force use, please study the manual or you can call a Mountz representative for assistance.

End User Software License Agreement

IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING

Do not use or load the Software from this disk or site or any Documentation until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to agree, do not install or use the Software.

This End User Software License Agreement ("Agreement") is between "You" (either an individual or an entity), the end user, and Mountz Incorporated, a California Corporation ("Mountz"). This Agreement authorizes You to use the Software identified below which may be provided on a CD-ROM, sent to You by electronic mail or downloaded from Mountz's web pages or servers or from other sources, under the terms and conditions set forth below. If You download the Software from a Mountz web site, then the legal notices and site terms and privacy policy posted on the applicable web site (collectively, the "Site Terms") shall be incorporated into and made a part of this Agreement by this reference and also govern your downloading and usage of the Software. This is an agreement on end user license rights and not an agreement for sale. Mountz continues to own the copy of the Software and the physical media contained in the sales package, if any, and any other copy that You are authorized to make pursuant to this Agreement.

1. SOFTWARE

As used in this Agreement, the term "Software" means, collectively and/or as applicable: (a) all the contents of the disk(s), CD-ROM(s), electronic mail and its file attachments, or other media with which this Agreement is provided, including the object code form of the software delivered via a CD-ROM, electronic mail or web-page; (b) related explanatory written materials and any other possible documentation related thereto ("Documentation"); and (c) upgrades, modified versions, updates, additions and copies of the Software (collectively "Updates"), if any, licensed to You by Mountz under this Agreement.

2. END USER RIGHTS AND USE

Mountz grants to You a non-exclusive, non-transferable copyright license to install the Software on the local hard disk(s) or other permanent storage media of one computer and use the Software on a single computer or terminal at a time. Except as expressly provided herein, no license or right is granted to You directly or by implication, inducement, estoppel or otherwise. Specifically, Mountz does not grant any express or implied right to You under Mountz patents, trademarks, or trade secret information. Nothing in this Agreement requires or will be treated to require Mountz to grant any additional license.

3. LIMITATIONS ON END USER RIGHTS

You may not copy, distribute, or make derivative works of the Software, except as follows:

- (a) You may make one copy of the Software on magnetic media as an archival backup copy, provided Your archival backup copy is not installed or used on any computer. Any other copies You make of the Software are in violation of this Agreement.
- (b) You may not use, modify, translate, reproduce or transfer the right to use the Software or copy the Software, except as expressly provided in this Agreement.
- (c) You may not resell, sublicense, rent, lease or lend the Software.
- (d) You may not reverse engineer, reverse compile, disassemble or otherwise attempt to discover the source code of the Software (except to the extent that this restriction is expressly prohibited by law) or create derivative works based on the Software.
- (e) You agree that You shall only use the Software in a manner that complies with all applicable laws in the jurisdiction in which You use the Software, including, but not limited to, applicable restrictions concerning copy right and other Mountz Intellectual property rights.

4. OWNERSHIP

The Software and all rights, without limitation including proprietary rights therein, are owned by Mountz and/or its licensors and affiliates and are protected by international treaty provisions and all other applicable national laws of the country in which it is being used. The structure, organization and code of the Software are the valuable trade secrets and confidential information of Mountz and/or its licensors and affiliates. You must not copy the Software, except as allowed in Section 3 (Limitations On End User Rights). Any copies which You are permitted to make pursuant to this Agreement must contain the same copyright and other proprietary notices that appear on the Software. You agree to prevent any unauthorized copying of the Software.

5. USER SUBMISSIONS

You agree that any material, information or other communication, including all data, images, sounds, text, and other things embodied therein, you transmit or post to a Mountz website or provide to Mountz under this Agreement will be considered non-confidential communications ("Communications"). Mountz will have no confidentiality obligations with respect to the Communications. You agree that Mountz and its designees will be free to copy, modify, create derivative works, publicly display, disclose, distribute, license and sublicense through multiple tiers of distribution and licensees, incorporate and otherwise use the Communications, including derivative works thereto, for any and all commercial or non-commercial purposes.

6. CONSENT

You agree that Mountz, its subsidiaries or suppliers may collect and use technical and related information, including but not limited to technical information about your computer, system and application software, and peripherals, that is gathered periodically to facilitate the provision of software updates, product support and other services to You (if any) related to the Software, and to verify compliance with the terms of this Agreement. Mountz may use this information, as long as it is in a form that does not personally identify you, to improve its products or to provide services or technologies to You.

7. MULTIPLE ENVIRONMENT SOFTWARE / MULTIPLE LANGUAGE SOFTWARE / DUAL MEDIA SOFTWARE / MULTIPLE COPIES / UPDATES

If the Software supports multiple platforms or languages, if You receive the Software on multiple media, or if You otherwise receive multiple copies of the Software, the number of computers on which all versions of the Software are installed shall be one computer. You may not rent, lease, sublicense, lend or transfer versions or copies of the Software You do not use. If the Software is an Update to a previous version of the Software, You must possess a valid end user license right to such previous version in order to use the Update and You may use the previous version for ninety (90) days after You receive the Update in order to assist You in the transition to the Update. After such time You no longer have a right to use the previous version, except for the sole purpose of enabling You to install the Update.

8 COMMENCEMENT AND TERMINATION

This Agreement is effective from the first date You install the Software. You may terminate this Agreement at any time by permanently deleting, destroying and returning, at Your own cost, the Software, all back-up copies and all related materials provided by Mountz. Your end user license rights automatically and immediately terminate without notice from Mountz if You fail to comply with any provision of this Agreement. In such event, You must immediately delete, destroy or return at Your own cost, the Software, all backup copies and all related material to Mountz.

9. NO WARRANTIES

YOU ACKNOWLEDGE THE SOFTWARE IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, AND TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW NEITHER MOUNTZ, ITS LICENSORS OR AFFILIATES NOR ANY COPYRIGHT HOLDERS MAKE ANY REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR THAT THE SOFTWARE WILL NOT INFRINGE ANY THIRD PARTY PATENTS, COPYRIGHTS, TRADEMARKS OR OTHER RIGHTS. THERE IS NO WARRANTY BY MOUNTZ OR BY ANY OTHER PARTY THAT THE FUNCTIONS CONTAINED IN THE SOFTWARE WILL MEET YOUR REQUIREMENTS OR THAT THE OPERATION OF THE SOFTWARE WILL BE UNINTERRUPTED OR ERROR-FREE. YOU ASSUME ALL RESPONSIBILITY AND RISK FOR THE SELECTION OF THE SOFTWARE TO ACHIEVE YOUR INTENDED RESULTS AND FOR THE INSTALLATION, USE AND RESULTS OBTAINED FROM IT.

8. NO OTHER OBLIGATIONS

This Agreement creates no obligations on the part of Mountz other than as specifically set forth herein. Mountz has no obligation to furnish You with technical support unless separately agreed in writing between You and Mountz.

9. LIMITATION OF LIABILITY

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL MOUNTZ, ITS EMPLOYEES, DIRECTORS, LICENSORS OR AFFILIATES BE LIABLE FOR ANY LOST PROFITS, REVENUE, SALES, DATA OR COSTS OF PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES, PROPERTY DAMAGE, PERSONAL INJURY, INTERRUPTION OF BUSINESS, LOSS OF BUSINESS INFORMATION OR FOR ANY SPECIAL, DIRECT, INDIRECT, INCIDENTAL, ECONOMIC, COVER, PUNITIVE, SPECIAL OR CONSEQUENTIAL DAMAGES, HOWEVER CAUSED AND WHETHER ARISING UNDER CONTRACT, TORT, NEGLIGENCE, OR OTHER THEORY OF LIABILITY ARISING OUT OF THE USE OF OR INABILITY TO USE THE SOFTWARE, EVEN IF MOUNTZ OR ITS LICENSORS OR AFFILIATES ARE ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. BECAUSE SOME COUNTRIES/STATES/JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY, BUT MAY ALLOW LIABILITY TO BE LIMITED, IN SUCH CASES, MOUNTZ, ITS EMPLOYEES OR LICENSORS OR AFFILIATES' LIABILITY SHALL BE LIMITED TO U.S.\$50. NOTHING CONTAINED IN THIS AGREEMENT SHALL PREJUDICE THE STATUTORY RIGHTS OF ANY PARTY DEALING AS A CONSUMER.

10. INDEMNITY

You will defend, at Your own expense, any legal action brought against Mountz to the extent that it is

based on any Indemnified Claim, which is any claims or allegation arising from or relating to Your breach of any provision of this Agreement including, but not limited to, a breach of Sections 2 and 3. You will pay any costs and damages finally awarded against Mountz that are attributable to any Indemnified Claim or that Mountz incurs through settlement of an Indemnified Claim, but will not be responsible for any compromise that Mountz makes or expense that Mountz incurs without Your consent. The defense and payments are subject to the condition that Mountz gives You prompt written notice of the Indemnified Claim, allows You to direct the defense and settlement of the Indemnified Claim, and cooperates with You as necessary for defense and settlement of the Indemnified Claim.

11. EXPORT CONTROL

You acknowledge that the Software, Documentation and all related technical information or materials are subject to export controls under the laws and regulations of the United States and any other applicable governments. You agree to comply with these laws and regulations governing export, re-export, import, transfer, distribution, and use of the Software, Documentation and all related technical information or materials. In particular, but without limitation, the Software, Documentation and all related technical information or materials may not be exported or re-exported (a) into any U.S. embargoed countries or (b) to any person or entity listed on a denial order published by the U.S. government or any other applicable governments. By using the Software, Documentation and all related technical information or materials, You represent and warrant that You are not located in any such country or on any such list. You also agree that You will not use the Software, Documentation and all related technical information or materials for any purposes prohibited by the U.S. government or other applicable governments' laws, including, without limitation, the development, design, manufacture or production of nuclear, missile, chemical or biological weapons. You confirm that the Software, Documentation and all related technical information or materials will not be re-exported or sold to a third party who is known or suspected to be involved in activities including, without limitation, the development, design, manufacture, or production of nuclear, missile, chemical or biological weapons. You agree that Software, Documentation and all related technical information or materials subject to control under defense laws and regulations (e.g., the International Traffic in Arms Regulations [ITAR]) must not be transferred to non-U.S. persons, whether located in the U.S. or abroad, without a government license. You will indemnify Mountz against any loss related to Your failure to conform to these requirements.

12. NOTICES

All notices should be emailed to: _____ at brad.mountz@mountztorque.com

13. APPLICABLE LAWS

Claims arising under this License Agreement shall be governed by the laws of the State of California, excluding its principles of conflict of laws and the United Nations Convention on Contracts for the Sale of Goods. Mountz is not obligated under any other agreements unless they are in writing and signed by an authorized representative of Mountz.

14. ARBITRATION

Any and all disputes that may arise between you and Mountz under or in connection with this Agreement, except for claims for injunctive relief, shall be submitted to final and binding arbitration heard by a single arbitrator in accordance with the then-current Arbitration Rules of the American Arbitration Association (the "AAA"), unless otherwise agreed in writing by the parties. Any counterclaim not brought within 15 days after receipt of the arbitration notice shall be barred. All matters within the scope of the Federal Arbitration Act (9 U.S.C. §§ 1 et seq.) shall be governed by it. The arbitration shall be conducted in any AAA arbitration facilities in the City of San Jose. The arbitration shall be conducted in the English language. The award shall include a written statement of findings of fact and conclusions of law and the reasons on which it is based. It also shall include an award of legal fees, costs and expenses, including reasonable attorneys' fees and the arbitrator's fees and expenses, to the prevailing party. Subject to any terms contained in this Agreement limiting or excluding damages, the arbitrator may award any relief that the arbitrator deems proper, including without limitation equitable relief, provided that the arbitrator shall not have authority to award exemplary, special or punitive damages. The award shall be enforceable in any court of competent jurisdiction. The terms of this Section shall continue in full force and effect subsequent to and notwithstanding the termination of this Agreement.

15. GENERAL PROVISIONS

If any part of this Agreement is found void and unenforceable, it will not affect the validity of the balance of the Agreement, which shall remain valid and enforceable according to its terms. This Agreement may only be modified in writing by an authorized officer of Mountz. This is the entire agreement between Mountz and You relating to the Software and it supersedes any prior representations, discussions, undertakings, end user agreements, communications or advertising relating to the Software.

Mountz Calibration & Repair Services

Mountz Inc. features an experienced calibration and repair staff. Our trained technicians can calibrate and repair most any tool. Mountz provides rapid service with quality that you can trust as we offer two state-of-the-art calibration lab and repair facilities that can calibrate up to 20,000 lbf.ft. We perform calibrations in accordance with ANSI/NCSL-Z540.

Since 1965, Mountz Inc. has proven its in-depth knowledge of torque and torque solutions by consistently developing, producing, marketing and servicing highly sophisticated, cutting-edge tools. Mountz Inc. is known to the industry as the premier torque tool supplier.

Tool Service & Repair Capability

- Torque Wrench Calibration: Click Wrench, Dial Torque Wrench, Beam Wrench, Cam-Over & Break-Over Wrench
- Torque Screwdrivers: Dial, Micrometer, Preset & Adjustable
- Torque Analyzers/Sensors: All brands
- Electric Screwdrivers: All brands
- Air Tools: All brands
Impact Wrenches, Drills, Pulse Tools, Grinders, Percussive Tools, Air Screwdrivers, Nutrunners, DC Controlled Nutrunners
- Torque Multipliers: All brands

Mountz Service Locations

Eastern Service Center

19051 Underwood Rd.

Foley, AL 36535

Phone: (251) 943-4125

Fax: (251) 943-4979

Western Service Center

1080 N.11th Street

San Jose, CA 95112

Phone: (408) 292-2214

Fax: (408) 292-2733